This catalog describes local programs in the eight models of academic/vocational curriculum integration on the secondary level identified by the National Center for Research in Vocational Education (NCRVE). The roster highlights models from nearly every state, representing a cross-section of rural, suburban, and urban school districts. Each model is described in both general and specific terms. The general description includes information about the target student population, the curriculum modifications, teachers involved, and any structural changes required. The specific description considers the advantages and challenges of each model as well as sample classroom activities. Finally, the growth potential of each model is discussed. Each model description is followed by a listing of examples and resources. The listing includes the name, address, telephone number, primary personnel, and other key personnel at each school and a summary of the school's integration program. The roster also includes the following: a summary table of all models; a list of examples by integration model number; a list of examples by state; a list of examples in alphabetical order; a summary of services provided by the NCRVE; a list of references and other products available from NCRVE; and an application form. The integration models described are the following: (1) vocational teachers introduce academic competencies into vocational courses; (2) vocational and academic teachers collaborate to enhance academic competencies in vocational classes; (3) academic teachers enhance the vocational relevance of the academic curriculum; (4) curriculum in both vocational and academic courses is modified and aligned; (5) senior projects; (6) the academy model; (7) occupational high schools and magnet schools; and (8) occupational clusters, career paths, and occupational majors. (KC)
NATIONAL ROSTER OF LOCAL PRACTICES IN THE INTEGRATION OF VOCATIONAL AND ACADEMIC EDUCATION
This publication is available from the:

National Center for Research in Vocational Education
Materials Distribution Service
Western Illinois University
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NATIONAL ROSTER OF LOCAL PRACTICES IN THE INTEGRATION OF VOCATIONAL AND ACADEMIC EDUCATION

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Supported by
The Office of Vocational and Adult Education,
U.S. Department of Education

February, 1994
FUNDING INFORMATION

Project Title: National Center for Research in Vocational Education
Grant Number: V051A30004-93A/V051A30003-93A
Act under which Funds Administered: Carl D. Perkins Vocational Education Act
P. L. 98-524
Source of Grant: Office of Vocational and Adult Education
U.S. Department of Education
Washington, DC 20202
Grantee: The Regents of the University of California
National Center for Research in Vocational Education
2150 Shattuck Avenue, Suite 1250
Berkeley, CA 94704
Director: Charles S. Benson
Percent of Total Grant Financed by Federal Money: 100%
Dollar Amount of Federal Funds for Grant: $6,000,000

Disclaimer: This publication was prepared pursuant to a grant with the Office of Vocational and Adult Education, U.S. Department of Education. Grantees undertaking such projects under government sponsorship are encouraged to express freely their judgement in professional and technical matters. Points of view of opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.

Discrimination: Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Title IX of the Education Amendments of 1972 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance." Therefore, the National Center for Research in Vocational Education project, like every program or activity receiving financial assistance from the U.S. Department of Education, must be operated in compliance with these laws.
ACKNOWLEDGMENTS

The National Roster of Local Practices in the Integration of Vocational and Academic Education represents the efforts of an extensive number of dedicated staff members from the National Center for Research in Vocational Education (NCRVE) along with all the schools that participated in the application process. The ideas contained within the document were modeled after two previous documents written with the same purpose to encourage school districts to participate in the integration reform effort.

It is essential that the National Roster be easily readable, interesting to practitioners, and have maximum utility to those interested in implementing new integration programs. The format used by the Nebraska Department of Education, Division of Educational Services booklet entitled “Enhancing Learning Environments through Curriculum Integration” was especially inspirational in NCRVE staff’s efforts to develop its National Roster.

The document compiled by Margaret Isom, Lois Beeken, and B. June Schmidt from Virginia Polytechnic Institute and State University, Division of Vocational and Technical Education, entitled Integration of Academic and Vocational Education in Secondary Schools: A Resource Guide was used as a primary source for potential participating schools for the National Roster.

Publishing this type of a document requires considerable staff effort. Thanks go to Erika Nielsen, who assisted both in the original creation of and in editing the National Roster. We also express appreciation to Peter Seidman for his assistance during the sometimes arduous process of publishing this type of a document. Last, but certainly not least, we thank Norton Grubb, whose work “The Cunning Hand, The Cultured Mind”: Models for Integrating Vocational and Academic Education was used as a primary resource document in the preparation of this report.

The extensive writing and communication with the school sites necessary to publish this document rested in the capable hands of Mayo Tsuzuki. The quality of this document speaks for itself and is a testament to her skills and dedication. Our sincere thanks also go to Laurie Holland for her unlimited patience and unequaled clerical skills used in the development of this document.
The National Roster would not have been developed nor have any purpose without the high quality examples of integration practices from the participating schools. Thus, this document is dedicated to them because it is they who are on the front line of this important and exciting reform effort.
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February 8, 1994

It is the "best of times" for the integration of vocational and academic education in the United States. Integration efforts enjoy support from every level of government, from business, from labor, and from the population at large. Why is this so? Perhaps it is because the integration movement is designed to serve all students, not just the academically oriented or those at risk. Everyone needs advanced skill levels to succeed in an increasingly competitive workplace, and every student can benefit from the integration practices presented here.

The purpose of the National Roster is primarily to highlight local programs in the eight models of integration that NCRVE has identified to date. The National Roster highlights models from nearly every state, representing a cross-section of rural, suburban, and urban school districts. This roster focuses on efforts at the secondary level; we hope that a subsequent roster will emphasize postsecondary practices.

If you are interested in more information regarding the National Roster or have any questions related to the integration of vocational and academic education, please call the Director of the National Network for Curriculum in Integration and Tech Prep at (510) 642-3824.

These are the best of times, but time is a scarce commodity. Act now and join us in creating a productive workforce for our country.

Yours truly,

Charles Benson, Director
HOW TO USE THE NATIONAL ROSTER OF LOCAL PRACTICES IN INTEGRATION

The National Roster is designed to inspire and guide change in the way vocational and academic instruction is delivered in schools across the country. Those who are leading and participating in this movement of educational change need to know about the approaches to integration described here. Readers may include, but are not limited to, vocational and academic teachers; school, district, and state administrators; researchers; policymakers; and parents. Some will find this handbook useful in building a better understanding of the concept of integration. Others, who have been very involved in creating the programs included here as examples, will use the roster as a directory of schools working with similar models of integration. We hope all will find this handbook useful in understanding the different ways integration brings about powerful changes in schools and students.

First, a word about the use of “models.” These models have been identified by observing the actual practice of integration in schools and determining the characteristics by which practices are found to be similar or different. For example, one such characteristic is the student population that is targeted to benefit from integration. Another determining characteristic is the subject areas to be involved in integration. Yet a third is the extent to which the structure of the school must be changed to implement a specific kind of integration. Because the categorization is based on real schools with local needs, it is important to keep in mind that there is no formula for the perfect implementation of any single model of integration. The description of each model is not to be taken literally, as a recipe, but rather as a set of very general guidelines. In practice, schools will need to modify these models to suit their own purposes.

In addition, many of the schools listed as examples continue to change as they develop better ways of defining students’ needs and meeting them. For this reason, these models are not intended to define the way the schools included here should or will be tomorrow, but rather to provide a snapshot, a picture, of the way they look today. Schools that are interested in a particular model of integration should keep in mind that just as the examples listed here may develop, they, too, can approach change incrementally. That is, it may be easier to begin to implement integration in one classroom at a time, with one teacher at a time, even though the eventual goal is to
restructure the entire school by replacing traditional subject departments with career paths or clusters. We urge schools to consider the possibilities of a series of integration models that will allow change to occur over time instead of dwelling on the impossibilities of fitting a single model and implementing dramatic change all at once.

Readers will find each model described in both general and specific terms. The general description includes information about the target student population, the curriculum modifications, teachers involved, and any structural changes required. The specific description considers the advantages and challenges of each model as well as sample classroom activities. Finally, the growth potential, or “future promise,” of each model is discussed.

Each model description is followed by a listing of examples and resources. The listing includes the name, address, phone number, and primary personnel for each school site. It also includes other key personnel, phone numbers, a checklist of what the key personnel are willing (or not willing) to do as resources to other schools, and a summary of the school’s integration program. Caveat: Information given on schools listed as examples was gathered from written applications submitted by schools and through contacts made by phone. In addition, a reference call was made for each school. However, these schools are highlighted as sites of change. Therefore, it is to be expected that the information provided here may have changed after the publication of this roster.

To assist readers in accessing this publication’s models and participating schools, the following table and lists precede the eight model descriptions and example listings:

- a summary table of all models
- a list of examples by integration model number
- a list of examples by state
- a list of examples in alphabetical order

Following the model descriptions and example listings are

- a summary of services, which include research, outreach, networking, and regional and national institute activities provided by NCRVE;
a list of references and other products available from NCRVE; and

- an application form.

We think of this roster as a living document, one that will grow and change as we learn more about integration efforts. We would like to hear about other efforts and have included an application form at the end of this roster to encourage schools to participate in and contribute to the growing network of schools that are improving education for all students.
## SUMMARY TABLE
### MODELS OF INTEGRATING VOCATIONAL AND ACADEMIC EDUCATION

<table>
<thead>
<tr>
<th>Model and Curriculum Changes</th>
<th>Teacher Changes</th>
<th>Students Targeted</th>
<th>Structural Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vocational teachers introduce academic competencies into vocational courses.</td>
<td>Vocational teachers modify curriculum, teaching methods.</td>
<td>Vocational students.</td>
<td>None.</td>
</tr>
<tr>
<td>2. Combining vocational and academic teachers to enhance academic content in vocational programs.</td>
<td>Academic teachers cooperate with vocational teachers to modify curriculum, teaching methods.</td>
<td>Vocational students.</td>
<td>None necessary; lack of shared planning and teaching periods or physical distance between vocational and academic classrooms may impede cooperation.</td>
</tr>
<tr>
<td>3. Making academic courses more vocationally relevant.</td>
<td>Academic teachers (usually) modify courses or adopt new ones.</td>
<td>Potentially all students; in practice, vocational and general-track students.</td>
<td>None.</td>
</tr>
<tr>
<td>4. Curricular alignment, horizontal and vertical. Both vocational and academic courses are modified and coordinated across courses and/or over time.</td>
<td>Vocational and academic teachers cooperate, coordinate curriculum modules, and modify teaching methods; numbers range from two to all.</td>
<td>Potentially all students; actual targets vary.</td>
<td>None necessary; shared planning periods and curriculum teams may foster cooperation.</td>
</tr>
<tr>
<td>Model</td>
<td>Curriculum Changes</td>
<td>Teacher Changes</td>
<td>Students Targeted</td>
</tr>
<tr>
<td>-------</td>
<td>-------------------</td>
<td>----------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>5. Senior projects.</td>
<td>Seniors replace electives with a project; earlier courses may change in preparation.</td>
<td>None necessary; project advisors and evaluators are normally recruited, and evaluation standards must be determined; teachers may develop new courses or modify content to better prepare students.</td>
<td>Potentially all students; actual numbers depend on advising and evaluating capabilities.</td>
</tr>
<tr>
<td>6. Academy model.</td>
<td>Alignment among academy courses (core academics and vocational focus) may take place.</td>
<td>Vocational and academic teachers may collaborate on both curriculum and students.</td>
<td>Usually potential dropouts; sometimes students interested in specific occupational areas.</td>
</tr>
<tr>
<td>7. Occupational high schools and magnet schools.</td>
<td>Alignment among all courses may take place, emphasizing the occupational focus.</td>
<td>All vocational and academic teachers assigned to an occupational school or magnet within a school; collaboration and course alignment facilitated.</td>
<td>Students interested in specific occupational areas.</td>
</tr>
<tr>
<td>8. Occupational clusters, career paths, and majors.</td>
<td>Coherent sequences of courses created; alignment may take place among courses within cluster.</td>
<td>Teachers belong to occupational clusters rather than (or in addition to) conventional departments; collaboration and course alignment facilitated.</td>
<td>All students.</td>
</tr>
</tbody>
</table>
# LIST OF SCHOOLS BY INTEGRATION MODEL NUMBER

<table>
<thead>
<tr>
<th>Model</th>
<th>School</th>
<th>Cross-Reference</th>
<th>State</th>
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<tbody>
<tr>
<td>1</td>
<td>Kentucky Tech Lee Campus</td>
<td>3</td>
<td>KY</td>
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<tr>
<td>1</td>
<td>Trezevant Vocational Tech Center</td>
<td>3</td>
<td>TN</td>
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<tr>
<td>2</td>
<td>Central Oklahoma Vo-Tech</td>
<td></td>
<td>OK</td>
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<tr>
<td>2</td>
<td>Columbus High School</td>
<td></td>
<td>WI</td>
</tr>
<tr>
<td>2</td>
<td>Gloucester County Institute of Tech</td>
<td></td>
<td>NJ</td>
</tr>
<tr>
<td>2</td>
<td>Muscle Shoals High School and Center for Tech.</td>
<td>1, 3, 4</td>
<td>AL</td>
</tr>
<tr>
<td>2</td>
<td>Phoenix Union High School District</td>
<td>1</td>
<td>AZ</td>
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<tr>
<td>2</td>
<td>Putnam Northern Westchester BOCES</td>
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<tr>
<td>2</td>
<td>Rolette High School</td>
<td></td>
<td>ND</td>
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<tr>
<td>2</td>
<td>Salem Vocational Center</td>
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<td>NH</td>
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<td>Suitland High School</td>
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<td>MD</td>
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<tr>
<td>2</td>
<td>Trigg County High School</td>
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<td>KY</td>
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<td>2</td>
<td>Wasilla High School</td>
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<tr>
<td>3</td>
<td>Alamo Navajo Community School</td>
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<td>NM</td>
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<td>3</td>
<td>Alvirne High School Vo-Tech Center</td>
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<td>3</td>
<td>Apple Valley Senior High</td>
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<td>MN</td>
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<td>3</td>
<td>Appleton Area Schools</td>
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<td>Berks Career &amp; Tech Center</td>
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<td>Central City High School</td>
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<td>Eastern Idaho Technical College</td>
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### LIST OF SCHOOLS BY STATE

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<th>Model</th>
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</tr>
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<td>Muscle Shoals High School and Center for Tech.</td>
<td>1, 3, 4</td>
<td>AL</td>
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<td>Phoenix Union High School District</td>
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MODEL ONE

VOCATIONAL TEACHERS INTRODUCE ACADEMIC COMPETENCIES INTO VOCATIONAL COURSES

The form of integration most easily and quickly achieved is the inclusion of academic content within regular vocational classes. The vocational teacher utilizes applied learning strategies to improve the academic success and basic skills of students who may have traditionally associated academic content with frustration and failure. The rigor of the academic content that is added to the vocational curriculum depends on the vocational teacher's comfort level with academic content, openness to change, and creativity. Therefore, this model of integration sometimes meets resistance from vocational teachers who prefer the familiarity of the status quo rather than the challenge of change.

Advantages

• Easily implemented by one teacher in single or multiple units within one or more classes.

• Provides strong basis and motivation for more formal collaboration between vocational and academic teachers.

• Provides academic content to students who have not mastered basic reading, writing, and math skills.

• Encourages teacher innovation.

• Increases academic content of vocational classes.
Challenges

- Does not address the problem of teacher burnout due to teacher isolation.
- Does not address the traditional split between vocational and academic teachers and students and, therefore, may not address tracking issues.
- Academic skills tend to be low level or remedial and, therefore, may not prepare students for high-skill, entry-level jobs.

Classroom Activities

Vocational education teachers may utilize the following:

- cooperative learning approaches to encourage students' acquisition of academic skills
- more writing exercises within the existing curriculum, including a variety of writing-to-learn activities—learning logs, reaction sheets, activity summaries, and comments in vocational classes
- authentic assessment practices such as writing samples, problem solving, and team problem solving to replace more traditional assessment methods
- prepared curriculum materials such as Principles of Technology, applied physics, Applied Communications, Applied Mathematics, applied biology, applied chemistry, and applied basic skills
- job search activities to reinforce language skills such as the preparation of letters of application, résumés and application forms, or crossword activities and word games using job-related vocabularies
- analytical activities to reinforce math and science skills such as using scientific measuring devices; reading; interpreting and creating graphs, charts, tables, recipes, and math story problems
Future Promise

It is important to emphasize that basic academic skills are absolutely essential in developing higher order competencies. Therefore, all vocational teachers should be encouraged to use this model of integration in addition to, and not to the exclusion of, other integration efforts.

Beyond the level of individual teachers in isolated classrooms, however, a more formal approach seeks to develop model vocational curricula and program frameworks for use in single school districts or school district consortia. This process requires the input and agreement of many vocational teachers and the testing of trial models. The curriculum frameworks are specific to single vocational areas and identify core academic and job-related competencies. This method identifies what occupations require in terms of academic skills and, with the support of local industry, teachers develop exercises and teaching methods to provide meaning-centered experiences to the students' education.
### Examples and Resources

**Kentucky Tech Lee Campus**  
P.O. Box B  
Beattyville, KY 41311  
(606) 464-5018  
Frank Kincaid

**Other key personnel:** (606) 464-5018  
Jerry Hollon — Counseling/Integration  
John Cook — Industrial Electricity  
Phyllis Hoskins — Math/Communications  
Richard Kazsuk — Auto Technology  
Rebecca Mullins — Office Technology

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- Writing and math portfolios are used in vocational classes to improve academic skills.  
- Higher level academic classes currently taught at the comprehensive high school such as physics and chemistry have collaboratively taught units with industrial electricity, welding, and auto technology.  
- "Real world" experiences through field trips to work sites and industries provide practical applications of math concepts.

**Trezevant Vocational Technical Center**  
3224 Range line Road  
Memphis, TN 38127  
(901) 357-3805  
Ms. Jo Gateley

**Other key personnel**  
Joyce Condron — App. Communications  
(901) 357-3814  
James Walker — Principles of Tech.  
(901) 357-3833  
Dorothy Bizzell — Guidance  
(901) 357-3809  
(901) 357-3818

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- Vocational teachers received training and incorporated basic academic skills instruction in reading, math, and science.  
- Science teacher acted as a consultant to vocational teachers to help provide instruction in basic science skills.  
- Collaboration with academic teachers helped identify academic competencies in vocational curricula.  
- Academic teachers at seven feeder high schools received training from vocational teachers to teach applied academics courses.
See also:

**Alamo Navajo Community School**  
**Model Three**  
P.O. Box 907  
Magdalena, NM 87825  
(505) 854-2635  
Gail Campbell

**Berks Career & Technology Center**  
**Model Three**  
R.D. #1, Box 1370  
Leesport, PA 19533  
(215) 378-4884  
Robert A. Runkle

**Bryan High School**  
**Model Eight**  
4700 Giles Road  
Omaha, NE 68157  
(402) 978-7200  
Tom O’Hara

**Jackson County High School**  
**Model Three**  
107 KY Hwy. 290  
McKee, KY 40447  
(606) 287-3121  
Betty Bond

**Muscle Shoals High School and Center for Technology**  
**Model Two**  
P.O. Box 2730  
Muscle Shoals, AL 35661  
(205) 389-2675  
Sharon Rue

**Phoenix Union High School District**  
**Model Two**  
1900 W. Thomas Road  
Phoenix, AZ 85015  
(602) 271-3287  
Joyce J. Prchal

**Wasilla High School**  
**Model Two**  
701 Bogard Road  
Wasilla, AK 99654  
(907) 376-5341  
Pat Gakin
MODEL TWO
VOCATIONAL AND ACADEMIC TEACHERS COLLABORATE TO ENHANCE
ACADEMIC COMPETENCIES IN VOCATIONAL CLASSES

Vocational students benefit from this form of integration that bridges the gap between vocational and academic teachers through collaboration. Often in response to state-required competency tests and increasingly strict graduation requirements, teams of vocational and academic teachers plan and implement an integrated curriculum for vocational classes. Academic material and skills are explicitly taught and tested in units that are often team-taught. Teacher teams have expectations of high level and complex skill development in both vocational and academic subjects.

Advantages

- Reduces teacher isolation of both vocational and academic instructors through the mutual expansion of knowledge in the other’s discipline through content and pedagogy collaboration.
- Emphasizes relevant applications of academic content for vocational students.
- Develops high-level academic skills of vocational students to provide tools for postsecondary success, whether in further education or career choice.
- Encourages teacher innovation and collaboration.
- Can be implemented by one or multiple vocational-academic teacher teams.
- Makes use of vocational classroom’s laboratory materials and equipment for academic exercises.
Challenges

- Only the vocational curriculum changes and only vocational students benefit. Traditional academic curriculum and teachers who are not involved may dismiss reform efforts as "vocational track" only.
- Academic skills tend to be specialized for a single vocational area and may not be viewed as transferable or comparable to those taught in traditional academic classes by teachers who are not involved.
- Requires the commitment and close coordination of at least two teachers.
- Requires flexibility of curriculum standards.
- Requires flexibility in master schedule to allow teacher collaboration for planning and teaching.

Classroom Activities

Academic teachers may help vocational teachers do the following:

- Teach individual lessons or modules within vocational classes that utilize extensive hands-on, laboratory exercises related to a particular vocational area.
- Develop hands-on exercises to develop explicitly academic skills.
- Work with individual students for intensive academic tutoring.
- Teach an applied academic subject that allows vocational students to receive credit toward academic graduation requirements.
- Provide real-life reasons for learning academic content and more collaborative, student-centered forms of learning.
Teams of vocational and academic teachers may

- develop curriculum materials for an applied academic subject that may or may not be team-taught;

- teach an entire applied academic subject or single academic units and modules with curriculum materials that may or may not be team-developed;

- demonstrate and provide practice of applications of higher math skills in industrial trades. For example, algebra can be emphasized in electronics with the use of Ohm's Law, and trigonometry can be taught in connection with machining by using sine bars;

- demonstrate and provide practice of English skill applications. A printing class can include daily newspaper reading. The principle of idea organization can be taught with flowcharts and other symbolic diagrams used in many vocational classes;

- utilize a class project to integrate math and/or communication skills with a vocational skill. Students may form a business that manufactures and sells a product. Math concepts guide the determination of costs and the manufacturing process itself. Communication concepts guide job applications, résumés, interviews, and performance reviews as well as product marketing efforts; and

- match a community need or local business strength with a class project. Urban schools may develop a community service project in which students research and learn about health and economic issues by building or repairing shelters for the homeless. Rural schools may establish a relationship with a local farm to provide an agri-science laboratory where students use biology and chemistry concepts to investigate plant or livestock production.
Future Promise

Teams do not have to be restricted to two teachers. For example, a school may start with a team of one math teacher and one vocational teacher. The school may choose to develop into an academy model (Model 6) or school-within-a-school, with a particular occupational focus. Additional academic teachers such as English, science, and social studies teachers can then be added to the team to address other academic competencies within that single occupational area. One applied academics course can serve all vocational students, but over time, a school may decide that is insufficient. For example, if the school develops ties to local business and industry and moves to an occupational cluster model (Model 8) in which several vocational areas are offered to students, then collaboration may create new teamings between one academic department and each of the occupational clusters.

Generally, the most difficult aspect of this model of integration is forging a sense of collaboration between teachers who have never before had to communicate let alone concern themselves with the same group of students. A second large barrier is the administrative one of finding time and money to enable two (or more) teachers to coordinate daily schedules. Once the first team overcomes the hurdles of communication, planning, and teaching coordination, however, the collaborators are unlikely to want to return to the isolation of the old lecture routine they used to follow. Therefore, the growth potential benefiting both teachers and students in this model is enormous. The important factor is increasing the number of bridges that connect teachers with other teachers, students with high-level vocational and academic skills, academic content with vocational relevance, and schools with the outside world.
### Central Oklahoma Vo-Tech

**3 CT Circle**  
Drumright, OK 74030  
(918) 352-2552 ext. 214  
Joe Ann Vermillion

**Other key personnel:** (918) 352-2552  
Nancy Miller Science  
Janet Foster Communication  
Robin Carney Principles of Tech.  
Roscoe Neal Math Interpreter

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate in panels  
- Participate in a conference

**Program summary**  
- Students in 29 vocational/technical programs receive additional academic instruction in one or two of the following programs:  
- Technical Related Skills Lab, which is team-taught by a science and a communications teacher and focuses on instruction of scientific principles and English skills.  
- Technical Related Math, in which a math teacher works with the vocational teacher in the Diesel, Electronics, Robotics, Auto Mechanics II, and Air Conditioning/Refrigeration classes.  
- Principles of Technology, for students in Electronics, Motorcycle Mechanics, Robotics, and Auto Mechanics I.  
- Central Oklahoma Vo-Tech serves students from 17 feeder high schools as well as an adult student population.

### Columbus High School

**1164 Farnham Street**  
Columbus, WI 53925  
(414) 623-5956  
Tom Antioho  
Richard Brouillard

**Other key personnel:** (414) 623-5956  
Sue Johnson Math/Science  
Diane Weiner Communications  
Tom Allen Tech Education

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- The Applied Academic Program is a pilot project to provide alternative methods of academic instruction to 10th through 12th graders who will be entering the workforce or attending a vocational/technical postsecondary institution.  
- Team planning and teaching are emphasized.  
- Academic instruction uses actual work experience, class projects, and community service.  
- Subject areas included are math, science, social studies, English, environmental education, business education, and technology education.
### Gloucester County Institute of Technology

**Address:**
P.O. Box 800
Tanyard Road
Sewell, NJ 08080

**Phone:** (609) 468-1445 ext. 2322

**Contact:** Beverly Davis

**Other key personnel:** (609) 468-1445
- K. Gottwald - Mathematics
- J. Peterson - Mathematics
- E. Reese - Communications
- E. Griffin - Communications

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs within 100 miles
- Speak at conferences
- Participate on panels
- Participate in a conference

**Program summary**
- Academic teachers team-teach applied math and applied communications with vocational teachers in vocational classes.
- Curriculum is developed by vocational and academic teacher teams to stress cooperative learning and problem solving using trade-specific and workplace applications.
- Students receive high school credit toward graduation for completing applied academics classes.

### Muscle Shoals High School and Center for Technology

**Address:**
P.O. Box 2730
Muscle Shoals, AL 35661

**Phone:** (205) 389-2675

**Contact:** Sharon Rue

**Will do the following:**
- Answer telephone questions
- Accept visitations

**Program summary**
- Collaboration occurs between
  - Vocational/Math
  - Vocational/Science

- Vocational and academic teachers work together to incorporate academic skills and concepts in vocational classes.
### Phoenix Union High School District

**Address:**
1900 W. Thomas Road  
Phoenix, AZ 85015  
(602) 271-3287  
Joyce J. Prchal

**Other key personnel**
- Sheryl Filliater: Math  
  (602) 271-2698
- Shirley Lowe: English  
  (602) 271-2985
- Judy Barrett: Program Manager, Carl Perkins  
  (602) 271-3288

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

**Program summary**
- Four academic teachers (two English and two math) have been hired as consultants to help vocational teachers integrate math and writing skills into their classes.
- Consultant teachers receive in-service training sessions and model teaching strategies in vocational classrooms.
- Posttest scores reveal positive impact on students' basic and advanced math and writing skills.

### Putnam Northern Westchester BOCES

**Address:**
200 BOCES Drive  
Yorktown Heights, NY 10598  
(914) 245-2700  
Rosemary Longo

**Other key personnel:**
- Irene Snow: Math/Voc. Ed. ext. 290
- George McCabe: Science/Urban Forestry ext. 432
- Mary Jo Kramer: Eng./Voc. Ed./Spec. Ed. ext. 290
- Vito Riaaldo: Social Studies/Voc. Ed. ext. 443
- Irene Gilchrist: Cosmetology ext. 441

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

**Program summary**
- Consultant teachers work alongside vocational teachers to enhance reading, math, and communication skills.
- Consultant and vocational teacher plan one hour per week and work with students and vocational teachers in the classroom three hours per week.
- Each consultant teacher works with a maximum of four vocational teachers.
<table>
<thead>
<tr>
<th><strong>Rolette High School</strong></th>
<th><strong>Salem Vocational Center</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>P.O. Box 97</td>
<td>44 Geremonty Drive</td>
</tr>
<tr>
<td>Rolette, ND 58366</td>
<td>Salem, NH 03079</td>
</tr>
<tr>
<td>(701) 246-3596</td>
<td>(603) 893-7073</td>
</tr>
<tr>
<td>Cliff Orgaard</td>
<td>Marshall Derry</td>
</tr>
</tbody>
</table>

**Other key personnel:** (701) 246-3596
Marilyn Orgaard          Home Economics
Marilyn Walsh             English

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Speak at conferences
- Participate on panels

<table>
<thead>
<tr>
<th><strong>Program summary</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Incorporate applied math units in agricultural education program.</td>
</tr>
<tr>
<td>- Students are able to see benefits and uses of math concepts that were previously presented only as theory.</td>
</tr>
<tr>
<td>- Home economics and English teachers collaborate to provide applied communications units.</td>
</tr>
<tr>
<td>- Agricultural Education and Home Economics programs require similar public speaking assignments in front of students, parents, and civic organizations.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Other key personnel:</strong> (603) 893-7073</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lena Vitagliano                      Academic/Vocational</td>
</tr>
<tr>
<td>Tom Aiello                           Academic/Tech Ed.</td>
</tr>
<tr>
<td>Richard Langlois                     Social Studies</td>
</tr>
<tr>
<td>(603) 893-7069</td>
</tr>
</tbody>
</table>

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

**Program summary**
- Four academic teachers in math/science and humanities collaborate with vocational faculty in ten programs to identify academic content in the vocational curriculum and academic skills necessary for success in each career path.
- Specific teaching techniques and supplemental materials have been jointly developed to improve student academic achievement.
- Pursuing restructuring efforts to align curriculum offerings for applied courses in mathematics and science.
### Suitland High School

**Address:** 5200 Silver Hill Road, District Heights, MD 20747  
**Phone:** (301) 568-7770  
**Principal:** Cecile Kahan

#### Other key personnel
- **W. Lester**  
  Occupational Skills  
  (301) 568-2505
- **D. Fleming**  
  Business  
  (301) 568-7770
- **R. Ferguson**  
  Art  
  (301) 568-2505

#### Will do the following:
- Answer telephone questions
- Accept visitations
- Participate in a conference

**Program summary**

- Suitland is composed of a magnet school (University High School), a Visual and Performing Arts School, a Vocational Technology School, and a comprehensive high school.
- To develop the integration of math and vocational/occupational classes, a team of four math teachers, four occupational skills teachers, a business teacher, an art teacher, a home economics teacher, and a special education teacher was created.
- In addition to remedial math skills and students with special needs, integration of algebra, geometry, and trigonometry with electronics, drafting, and carpentry were also addressed.

### Trigg County High School

**Address:** 203 E. Main Street, Cadiz, KY 42211  
**Phone:** (502) 522-2215  
**Principal:** Joyce S. Bozarth

#### Other key personnel
- **Brenda Southwick**  
  Home Economics  
  (502) 522-2215
- **Clayton Burgess**  
  Integration Sup’r  
  (502) 753-4470

#### Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

**Program summary**

- Collaboration occurs in  
  - Science/Agriculture  
  - Science/Health  
  - Math/Home Economics  
  - Math/Retailing  
  - Math/Technical Education
- Teachers meet after school to plan and develop curriculum.
- Students are sometimes brought together in one classroom for team-taught projects; teachers sometimes exchange classes for specific units.
**Wasilla High School**  
701 Bogard Road  
Wasilla, AK 99654  
(907) 376-5341  
Pat Gakin

*Other key personnel:* (907) 376-5341  
Kathy Frost  
Business/Co-op Coord.

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- "A Personal Transition Plan for Applied Communications" is a six-week unit that is team-taught for all students by the business teacher and academic counselor designed to help students answer the question, "What will help me get ready for life after high school?"
- Students investigate career options, create a résumé, write job application or postsecondary admission letters, and demonstrate job search and interview skills.
- Other collaborations to occur in  
  - Business/Economics and Social Studies  
  - Graphics/Art
See also:

**Appleton East/West High Schools**  
Model Three  
120 E. Harris Street  
Appleton, WI 54913  
(414) 832-6145  
Gari Spagnoletti

**Central City High School**  
Model Three  
1804 14th Avenue  
Central City, NE 68826  
(308) 946-3086  
Ray Huggett

**Eldorado High School**  
Model Four  
P. O. Box W  
Eldorado, TX 76936  
(915) 853-2549  
Kenneth L. Newman

**Jackson County High School**  
Model Three  
107 KY Hwy. 290  
McKee, KY 40447  
(606) 287-3121  
Brian Thomas

**Lincoln High School**  
Model Four  
2229 J Street  
Lincoln, NE 68510  
(402) 436-1301  
Sanford Nelson

**Milwaukee South Division High**  
Model Eight  
1515 W. Lapham Blvd.  
Milwaukee, WI 53204  
(414) 384-9900  
David Heinbuch

**Pampa High School**  
Model Three  
111 E. Harvester  
Pampa, TX 79065  
(806) 669-4800  
Daniel Coward

**Paul M. Hodgson Vocational-Technical High School**  
Model Five  
2575 Summit Bridge Road  
Newark, DE 19702  
(302) 834-0100  
Dr. Steven H. Godowsky

**York County Area Vocational-Technical School**  
Model Four  
2179 S. Queen Street  
York, PA 17402  
(717) 741-0820  
Ron Arnold
MODEL THREE
ACADEMIC TEACHERS ENHANCE THE VOCATIONAL RELEVANCE OF THE ACADEMIC CURRICULUM

Integration occurs within academic rather than vocational classes in this model. These classes may be used as substitutes for traditional academic subjects or as complements to them with particular vocational relevance. In the latter case, academic teachers refer to many vocational areas, highlighting the relevance of academic principles to the future working worlds of students. As substitutes for traditional academic classes, the new courses, typically labeled "applied" academics, receive the equivalent academic credit toward graduation requirements. Such courses are described as providing extensive hands-on laboratory experience to practice using the academic material. Curriculum materials can either be developed by teachers individually or in teams, purchased "off-the-shelf," or developed with the input of representatives from local business and industry who want to emphasize particular skills and training for future employees. Often, the help of local business is also sought to provide equipment or reading materials for use in lab sessions that an academic classroom may not have. Applied academics may be targeted to all students, not just those in a vocational track.

Advantages

- May be used to address the needs of all students, not just those in a vocational track.
- Can be implemented by individual teachers in single or multiple units.
- Encourages teacher innovation.
- Uses the best of vocational teaching strategies in the academic classroom; hands-on experimentation and applications of theory make academic content a more relevant focus for the student's future.
- Can provide a strong basis and motivation for formal collaboration between vocational and academic teachers.
Provides the basis for formal relationships between schools and local business and industry to benefit both students and future employers.

Challenges

- May not address teacher burnout due to isolation from other teachers.
- Requires that academic teachers learn the vocational relevance of abstract academic content and adopt new pedagogical techniques to replace traditional lecture-drill methods.
- May not address the traditional split between vocational and academic teachers.
- In some instances, hands-on experiences may require monetary and/or in-kind resources.
- "Off-the-shelf" courses require teachers to adapt the curriculum to local conditions. Without this kind of custom tailoring, these courses do not encourage teacher collaboration or innovation, or adaptation to local employment conditions.
- Applied academics courses may become remedial rather than innovative.

Classroom Activities

Academic teachers may

- develop specialized curriculum materials to focus on local business or individual student’s career interests.
- modify packaged, "off-the-shelf" curriculum materials either for single modules or for entire courses.
- incorporate frequent vocational applications such as literature that describes individuals at work or job-related writing exercises in English classes, job-related examples from carpentry, machining, electronics and other areas for math classes, examinations of the implications of biology for health workers, electricity for electronics and computer occupations, or physics for the design of machines.
develop new courses or teacher "off-the-shelf" courses individually or in teams with vocational teachers that receive academic credit. The most common examples are Principles of Technology, an applied physics course, Applied Mathematics, or Applied Communications.

- use lab experiments that provide real situations in which both instructors and students do not know the outcomes and, therefore, successes and failures are not predetermined.

**Future Promise**

In order to address the lack of student motivation and answer the question of the vocational relevance to students of academic subjects, academic teachers must change the way they see their role in the classroom. Two places to look for some answers are the vocational classrooms and the local business community and job market. Like Model Two, this third model provides the basis for open communication between schools and business, and between teachers in two different kinds of classrooms. Once the academic teacher makes the connection between the worlds of academics and workplace, the potential resources available to help students make the connection are impressive. For example, academic teachers may discover that vocational teachers have extensive laboratory setups, and the equipment and machinery to provide wonderfully creative hands-on practice for students in academic classes. This can then lead to fully team-developed curricula and team-taught courses.

Academic teachers may find that local business professionals are eager to cooperate with schools to raise the academic performance expectations of all students, particularly those who will enter the local job market in less than four years. From informal conversations to the arrangement of paid cooperative job experiences, relationships with business and industry must be viewed from a long-term perspective and nurtured carefully. Businesses cannot be viewed just as sources of free handouts but as partners in an extensive school reform effort. Over time, a school-business partnership can develop an array of opportunities for students to explore career options that may include guest speakers, tutors, mentors, job shadowing, cooperative job experiences, or apprenticeships. The shared goal of schools and businesses is a better educated, better trained young population.
### Examples and Resources

<table>
<thead>
<tr>
<th>Alamo Navajo Community School</th>
<th>Program summary</th>
</tr>
</thead>
</table>
| P.O. Box 907  
Magdalena, NM 87825  
(505) 854-2635  
Gail Campbell | All students are ESL–Navajo Indian. |
| **Other key personnel** | Program shows students how to recognize vocational situations in academic classes, particularly agricultural applications in language arts and science classes. |
| Steve Mills  
Business Owner  
(505) 854-2717  
Sandy Kuznia  
Business Education  
(505) 854-2635 | Helps overcome the problems of transferring information and concepts to other disciplines. |
| **Will do the following:** | All students who meet academic graduation requirements must receive on-the-job training. |
| - Answer telephone questions  
- Accept visitations  
- Visit other programs beyond 100 miles  
- Speak at conferences  
- Participate on panels  
- Participate in a conference | |

<table>
<thead>
<tr>
<th>Alvirne High School Vocational-Technical Center</th>
<th>Program summary</th>
</tr>
</thead>
</table>
| Derry Road  
Hudson, NH 03051  
(603) 886-1260 ext. 34  
Wilbur H. Palmer | Created integrated Agribiology and Agrimath courses for students in its nationally recognized model agricultural science program. |
| **Will do the following:** | Math for Life Sciences and Technical Math have been added for students in Health Occupations and Building Trades programs. |
| - Accept telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference | - There is an emphasis on real-life experiences to reinforce the relevance of academic skill development. An adult daycare program, full-service bank, greenhouse, retail florist shop, school store, and restaurant operate at the school. |
### Appleton East/West High Schools

120 E. Harris Street  
Appleton, WI 54913  
(414) 832-6154  
Gari Spagnoletti

**Other key personnel:** (414) 832-6154  
Chuck Phillip  
Ray Rudzinski  
John Price  
Science  
Math  
English

**Program summary**
- Technical academic courses offered for academic credit are  
  - Science/Technical Education  
  - Technical Math  
  - Technical English

- At each high school, 10-12 technical and academic teachers collaborate to develop academic competencies and activities.

- Youth apprenticeship in printing industries provides 11th graders with three days of work combined with two days of school per week.

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

### Apple Valley Senior High School

14450 Hayes Road  
Apple Valley, MN 55124  
(612) 431-8244  
Sharon Mitchell

**Other key personnel:** (612) 431-8244  
Chris Lee  
Science

**Program summary**
- Food Science is team-taught and satisfies a science course credit.

- Integrates concepts and theories studied in science class with the analytical and production processes found in home economics classes.

- Uses equipment and facilities from both science and home economics and provides students the opportunity to apply theory into practice.

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference
## Berks Career & Technology Center
R.D. #1, Box 1370
Leesport, PA 19533
(215) 378-4884
Robert A. Runkle

### Other key personnel
- John M. DeVere: Project Administration (215) 372-4721
- Dale A. Cullin: Project Administration (215) 378-4884
- K. Robert Hohl: Project Administration (215) 987-8403
- Paul R. Roedel: Project Administration (215) 208-3044

### Program Summary
- Center serves 16 feeder high schools.
- Goal is to significantly improve academic achievement levels of non-college preparatory graduates in math, science, communications, and analytical skills.
- Core groups of math, science, and English teachers from each of the feeder high schools meet with vocational teachers at the center to identify vocational applications to enhance applied academics instruction as well as academic competencies emphasized in vocational classes.
- Meetings between vocational and academic teachers (1) build awareness of integration, (2) encourage resource sharing, and (3) lead to teacher teaming.

### Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs within 100 miles
- Speak at conferences
- Participate on panels
- Participate in a conference

## Central City High School
1804 14th Avenue
Central City, NE 68826
(308) 946-3086
Ray Huggett

### Other key personnel:
- Judy Williams: Science (308) 946-3086
- Gene Boeka: Social Science
- Deb Hankinson: English
- Dave Jorgensen: Art
- Gary Maresh: Agriculture

### Program summary
- Projects in science classes raise students' interest and success rate in science.
- A remodeled faculty lounge with an Integration Board, an integration file, and a system of classroom visitations help staff share and collaborate.
- Example: Groundwater problem project
  - Measured nitrate level in water samples
  - Developed strategies for community to combat problem
  - Examined interaction of environmental factors, scientific process, and agricultural community

### Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference
<table>
<thead>
<tr>
<th>Eastern Idaho Technical College</th>
<th>Program summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1600 S. 2500 E</td>
<td></td>
</tr>
<tr>
<td>Idaho Falls, ID 83404</td>
<td>- Mechanical Trades and Welding instructors teamed with an English instructor to develop an applied communications course.</td>
</tr>
<tr>
<td>(208) 524-3000 ext. 329</td>
<td></td>
</tr>
<tr>
<td>Carol Lowe</td>
<td>- The team-taught course provided one hour per day for eight weeks during the Mechanical Trades and Welding classes.</td>
</tr>
<tr>
<td>Other key personnel: (208) 524-3000</td>
<td>- All communications competencies were taught within the context of what would be needed by the students in their occupational fields.</td>
</tr>
<tr>
<td>Val Chambers Mechanical Trades</td>
<td>- Work on computers, résumés, interviewing skills, and job-seeking skills was included in the modified English curriculum.</td>
</tr>
<tr>
<td>Kyle Kofford Welding</td>
<td></td>
</tr>
<tr>
<td>Will do the following:</td>
<td></td>
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<tr>
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<thead>
<tr>
<th>Idaho Falls High School</th>
<th>Program summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>601 S. Holmes Avenue</td>
<td></td>
</tr>
<tr>
<td>Idaho Falls, ID 83401</td>
<td>- A Principles of Technology teacher and a math/science teacher team-taught science competencies within the context of the Principles of Technology curriculum.</td>
</tr>
<tr>
<td>(208) 525-7740</td>
<td></td>
</tr>
<tr>
<td>Miles Carroll</td>
<td>- Academic content was significantly modified to fit the applied curriculum.</td>
</tr>
<tr>
<td>Other key personnel: (208) 525-7740</td>
<td>- Student performance improved dramatically.</td>
</tr>
<tr>
<td>Jack Schwieder Math, Science</td>
<td>- Plans for 1993-1994 school year include a team-developed and taught applied Algebra course for students who have not been successful in traditional Algebra.</td>
</tr>
<tr>
<td>Mary Farner Math</td>
<td></td>
</tr>
<tr>
<td>Will do the following:</td>
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</tr>
<tr>
<td>- Participate on panels</td>
<td></td>
</tr>
<tr>
<td>- Participate in a conference</td>
<td></td>
</tr>
</tbody>
</table>
Jackson County High School
107 KY Hwy. 290
McKee, KY 40447
(606) 287-7155
Betty Bond

Other key personnel: (606) 287-7155
Brian Thomas    Physics
Mike Gabbard    Industrial Arts
Diana Miller    Home Economics
Janine Turner    Science/Biology
Doug Wilson    Vo. Agriculture
James Followell    Vo. Agriculture
Michael Witt    Biology

Will do the following:
• Answer telephone questions
• Accept visitations
• Visit limited number of other programs within 100 miles
• Speak at conferences
• Participate on panels
• Participate in a conference

Program summary
• Traditional physics, biology, and chemistry have been replaced by team-taught physics, nutritional chemistry, and agribiology.

• Industrial Arts and Physics teachers provide 5% lecture, 20% demonstration, and 75% hands-on activity to make physics accessible to all students.

• Nutritional Chemistry is designed for students who would have difficulty in a traditional chemistry class. Students receive science course credit.

• Agribiology uses two biology and two agriculture teachers in a nine-week rotation of classes for students in 9th and 10th grades. Practical application is achieved through soil science and management, agronomy, large animal production, and selected agricultural genetics.

• Traditional science scores have increased and student interest in science is greater.
Lindsey Hopkins Technical Education Center  
750 N.W. 20th Street  
Miami, FL 33127  
(305) 324-6070 ext. 4031  
Lourdes Oroza  

Other key personnel: (305) 324-6070  
Richard Firsten General VESOL  
Monica Oliva Business VESOL  
Eloise Cooke H.O. VESOL  
Renee Klosz ESOL  
James Parker Surgical Tech.  

Will do the following:  
• Answer telephone questions  
• Accept visitations  
• Visit other programs  
• Speak at conferences  
• Participate in panels  
• Participate in a conference  

Program Summary  
• English for Speakers of Other Languages (ESOL) is a general English language course offered at Lindsey Hopkins for adults.  
• The general ESOL curriculum has been modified and integrated with several vocational cluster courses at Lindsey Hopkins. A general VESOL class emphasizes the language needed to find and keep a job.  
• Integrated VESOL classes teach specialized vocabulary and communication skills. They include  
  • Business VESOL  
  • Health Occupations VESOL  
  • Industrial VESOL  

Mansfield Independent Schools  
605 E. Broad  
Mansfield, TX 76063  
(817) 473-5682  
Jerry Knight  

Other key personnel: (817) 473-5660  
Melissa McClure Math  
Judy Joriano Language Arts  
Gordon Hoffman Science  
Janie Washburn Home Economics  

Will do the following:  
• Answer telephone questions  
• Accept visitations  
• Visit other programs  
• Speak at conferences  
• Participate on panels  
• Participate in a conference  

Program summary  
• Four teams of math/vocational teachers have collaborated to develop the curriculum and lab activities for Integrated Algebra I. Vocational areas are  
  • Home Economics  
  • Horticulture  
  • General Mechanics  
  • Computer Education  
• Integrated Algebra provides teaching strategies and learning activities to make traditional math concepts more accessible and meaningful to students.  
• Integrated courses in physical science and language arts are targeted to be developed next.
**Northwest Technical School**  
1515 S. Mann  
Maryville, MO 64468  
(816) 562-3022  
Paul Coffman

**Other key personnel:** (816) 562-3511  
Elaine Nichols  Applied Math  
Mike Cosgrove  Applied Physics  
Lori Worthington  Applied Biology/Chemistry  
Davis Throctmortin  Applied Communications  
David Duvall  Electronics (816) 562-3022  
Lee Miller  Basic Skills (816) 562-3022

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- Applied academics courses have been integrated into the vocational programs by using basic skills instruction to teach math and communications.  
- Applied Math I and II are offered to 9th and 10th graders as a prevocational math class to improve problem-solving skills.  
- Applied Physics is offered both as a stand-alone course to all students and as an integrated course for trade and technical classes.  
- Applied Biology/Chemistry and Applied Communications are offered to 9th and 10th graders as a preparatory class prior to enrolling in technical programs at the high school level.
<table>
<thead>
<tr>
<th>Palm Bay High School</th>
<th>Program summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pirates Lane</td>
<td>A technology education center concentrating on applied technology will open in September 1993.</td>
</tr>
<tr>
<td>Melbourne, FL 32901</td>
<td>The center will house individualized learning centers for Technology Learning Activities to enhance applied academic courses in English, mathematics, and science.</td>
</tr>
<tr>
<td>(407) 952-5900</td>
<td>As part of the school's complete reform efforts, several occupational clusters have been identified and are continually being developed, updated, and modified based on discussions with business. Among these are:</td>
</tr>
<tr>
<td>Matt Conroy</td>
<td>- Public Service</td>
</tr>
<tr>
<td>Other key personnel: (407) 633-1000</td>
<td>- Business Technologies</td>
</tr>
<tr>
<td>Ginger Davis</td>
<td>- Engineering</td>
</tr>
<tr>
<td>Lee Bailey</td>
<td>- Health Occupations</td>
</tr>
<tr>
<td>Irene Ramarine</td>
<td>- Building Trades</td>
</tr>
<tr>
<td>Matt Conroy</td>
<td>- Communication Technologies</td>
</tr>
<tr>
<td>Jim Cahill</td>
<td>- Biotechnologies</td>
</tr>
<tr>
<td>Tech Prep Director</td>
<td>(407) 632-1111</td>
</tr>
</tbody>
</table>

Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

<table>
<thead>
<tr>
<th>Pampa High School</th>
<th>Program summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>111 E. Harvester</td>
<td>Vocational teachers team teach with traditional English I teachers and also</td>
</tr>
<tr>
<td>Pampa, TX 79065</td>
<td>- guest lecture and</td>
</tr>
<tr>
<td>(806) 669-4800</td>
<td>- provide lab demonstrations.</td>
</tr>
<tr>
<td>Daniel Coward</td>
<td>The approach was so popular in two pilot classes that parents requested that it continue. Program will expand to entire English I curriculum as well as to English II pilot classes in 1993-1994, involving more than 300 students, seven vocational teachers, and five English teachers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other key personnel: (806) 669-4800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary Sturgeon English</td>
</tr>
<tr>
<td>Gaylene Skaggs Home Economics</td>
</tr>
<tr>
<td>Katie McDonald Home Economics</td>
</tr>
<tr>
<td>Nancy Coffee English</td>
</tr>
<tr>
<td>Donna Crow Marketing</td>
</tr>
</tbody>
</table>

Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate in a conference
<table>
<thead>
<tr>
<th>Wheeling Park High School</th>
<th>Program summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Park View Road</td>
<td>- Vocational-technical programs have been restructured into semester and yearlong courses to provide more time-on-task and integrate applied academics courses into the regular curriculum.</td>
</tr>
<tr>
<td>Wheeling, WV 26003</td>
<td>- Newly added integrated academics courses include Applied Math, Applied Communications, and Principles of Technology.</td>
</tr>
<tr>
<td>(304) 243-0413</td>
<td>- All vocational-technical programs have a planned program of study; two and three-hour vocational block classes in the comprehensive high school setting have been eliminated.</td>
</tr>
<tr>
<td>Christine N. Carder</td>
<td><strong>Will do the following:</strong></td>
</tr>
</tbody>
</table>

*Other key personnel:* (304) 243-0413
Larry Lamb, Applied Math
Sandy Mauck, Applied Communications

- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

<table>
<thead>
<tr>
<th>Woodward High School</th>
<th>Program summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1023 Tenth Street</td>
<td>- Program is a pilot project and joint venture between High Plains Area Vocational and Technical Schools and four feeder high schools, including Woodward High School</td>
</tr>
<tr>
<td>Woodward, OK 73801</td>
<td>- Applied curriculum in physics, math, and biology/chemistry integrates real-world applications into content areas traditionally considered theory-based.</td>
</tr>
<tr>
<td>(405) 256-6063</td>
<td>- Teaming between vocational-technical instructors and academic teachers modified course delivery in order to create successful conditions for students who previously have not been successful in traditional settings.</td>
</tr>
<tr>
<td>Mike McClaren</td>
<td>- Data reflects significant growth in science scores and led to expansion of the pilot project to 20 additional sites throughout Oklahoma.</td>
</tr>
</tbody>
</table>

*Other key personnel:* (405) 256-5329
Tom Fisher, Math
Greg Johnson, Applied Physics
Joan Gaston, Research
(405) 256-6063

**Will do the following:**
- Accept visitations
- Speak at conferences
- Participate on panels
- Participate in a conference
See also:

**Eldorado High School**  
Model Four  
P.O. Box W  
Eldorado, TX 76936  
(915) 853-2549  
Kenneth L. Newman

**Hazleton Area High School**  
Model Four  
101 S. Church Street  
Hazleton, PA 18201  
(717) 459-3111 ext. 3125  
Dr. Edward S. Lyba

**Illinois Valley Central High School**  
Model Two  
1300 W. Sycamore  
Chillicothe, IL 61523  
(309) 274-5418  
Susan Goodale

**Hoke County High School**  
Model Two  
310 Wooley Street, P.O. Box 370  
Raeford, NC 28376  
(919) 875-4106  
Jeffrey C. Moss

**Kentucky Tech Lee Campus**  
Model One  
P.O. Box B  
Beattyville, KY 41311  
(606) 464-5018  
Frank Kincaid

**Mt. Diablo High School**  
Model Four  
2450 Grant Street  
Concord, CA 04520-2297  
(510) 682-4030  
Judy Moon

**Muscle Shoals High School and Center for Technology**  
Model Two  
P.O. Box 2730  
Muscle Shoals, AL 35661  
(205) 389-2675  
Sharon Rue

**Trezevant Vocational Technical Center**  
Model One  
3224 Rangeline Road  
Memphis, TN 38127  
(901) 357-3805  
Ms. Jo Gateley
MODEL FOUR
CURRICULUM IN BOTH VOCATIONAL AND ACADEMIC COURSES IS MODIFIED AND ALIGNED

This model of integration is one effective way of transforming secondary education to benefit all students and, therefore, teachers, parents, and employers. No longer following the decades-old tradition of unrelated bits and pieces of abstract knowledge, the student’s high school experience becomes cohesive and fully integrated across the entire vocational and academic curriculum. It acknowledges and creates connections between the work done in classrooms and the work done outside them.

In vocational classrooms, teachers include more academic rigor and content (as in Model One). In academic classrooms, teachers make frequent and consistent use of good vocational pedagogy (as in Model Three)—hands-on practice, real-life applications of content and skills, and an understanding of the occupational relevance of academic competencies. In its basic form, pairs of vocational and academic teachers collaborate (as in Model Two) to find common themes and practical applications, but teaching does not have to occur in teams. Alignment occurs when students are frequently working on the same hands-on project or learning the same academic principles in a vocational and an academic subject simultaneously. This kind of alignment across subject matter is often referred to as “horizontal alignment” and is characterized by consistent and mutually reinforced learning experiences for all students.

Advantages

• Can address student tracking issues by benefiting all students.

• Reduces teacher isolation by building bridges of communication and respect between vocational and academic teachers.

• Emphasizes real-life applications of academic content and increases academic rigor of vocational classes.

• Encourages teacher innovation and collaboration.
NCRVE, MDS-768

- Does not require master schedule coordination for team teaching because vocational and academic content are still taught in separate classes.

Challenges

- Requires that students enroll in aligned vocational and academic courses in order to benefit fully from mutual content reinforcement.
- Requires the commitment and coordination of at least two teachers to plan aligned curriculum.
- Requires master schedule coordination for joint planning time.
- Requires flexibility of curriculum standards.
- Cannot rely on "off-the-shelf" curriculum materials.
- Requires that vocational teachers adopt more rigorous academic standards and academic teachers adopt more vocationally relevant pedagogical techniques and exercises.

Classroom Activities

In horizontally aligned classes, vocational and academic teachers may

- regularly present students with problems to be solved in the vocational class, teach the general competencies for successful solutions in the academic class, and develop solutions in the vocational class.
- develop assignments that bridge vocational areas and academic content as is the strategy underlying Senior Projects (Model Five). For example, a career research assignment can culminate in a research paper that receives credit in both a required career exploration course and a freshman English class. Students learn to use the library's resources to investigate and answer questions that are discussed in the vocational class while learning how to write in the style appropriate to a formal paper in English class.
• attract new populations of students to either vocational or academic classes. For example, more vocational track students can be introduced to geometry or physics by enrolling in aligned drafting or electronics courses. On the flip side, traditional college-track students can benefit from the practical applications and career exploration that are presented in aligned vocational classes.

• develop a unit or project with a theme that links a vocational and academic subject. A foreign language and computer class can be aligned to develop a computer game that tests language knowledge. A journalism and English class can be aligned to help students produce a magazine or newspaper issue.

Additionally, the activities listed under Model Two are also appropriate here.

**Future Promise**

There are two ways to think about growth in this integration model: quantitatively and qualitatively. In terms of the first, growth can be achieved by adding more teachers and/or more aligned classes. This kind of growth is almost unavoidable because more teachers want to participate in and benefit from the creative exchange and rejuvenation that characterizes successful collaborative reform efforts. The connections between vocational and academic materials are easy to find once their identification is a priority. Teachers in both areas often find that the other teacher has a surprising amount to contribute and, with a focus on improving instruction for students rather than protecting one’s turf, curriculum alignment can be exciting and substantive.

Quantitative growth can also be the result of identifying larger numbers of students who will benefit from this integration approach. As a school develops into any of the larger models of integration (Models Six, Seven, or Eight), more students’ needs are met by more horizontally aligned classes. New categories such as career clusters replace the traditional track system and develop all students’ future-oriented thinking whether they are college-bound or not. The underlying assumption is that no one is harmed by curriculum alignment, and everyone can benefit.

Qualitatively, growth takes shape in new and different forms of alignment. Teacher teams need not be limited to vocational-academic pairs. Two academic or two
vocational teachers may work together to align units, assignments, or full courses. For example, an English and social studies team may develop units to investigate social and political issues that are of local concern. The course alignment allows students twice the class time to cover topics. When this type of alignment is considered, however, keep in mind that only the students enrolled in the aligned courses will benefit. If vocational students are the target population, course alignment must match vocational student enrollment.

A second type of qualitative growth involves the development of coherent sequences of courses that students follow over the course of their high school education. This vertical alignment is often introduced when a school wants to encourage career exploration and choice, and provide specific career clusters as in Models Seven or Eight. Students entering high school indicate a career preference. Based on that preference, a sequence of vocational and academic courses is selected to enable the student to reach the appropriate level of occupational skill and academic preparation by graduation four years later.
Examples and Resources

**Bacon Academy - Colchester Public Schools**
611 Norwich Avenue
Colchester, CT 06415
(203) 537-2378
Everett Herden

*Other key personnel:* (203) 537-2378
- Everett Herden  Science
- Linda Dadona  Math
- Joseph Valentini  Tech. Ed.
- Nikki Gullickson  Environmental/Social
- Bob Houle  Project Evaluator/Research Data

*Will do the following:*
- Answer telephone questions
- Accept visitations
- Visit other programs beyond 100 miles
- Speak at conferences
- Participate in panels
- Participate in a conference

**Program summary**
- Aligned courses:
  - Biology
  - Geometry
  - Technical Education
- Course is taught in one, three-period (135 minutes) block course built around one general environmental theme and eight specific topics around which units of instruction and learning activities are designed.
- Three teachers team-teach the course for sophomores in the middle 50% achievement range with uncertain motivation.
- Problem solving, cooperative learning, hands-on learning experiences, and performance/portfolio/exhibition assessment are featured.

**Cedar Bluffs High School**
110 E. Main Street
Box 66
Cedar Bluffs, NE 68015
(402) 628-2080
Myron Ocander

*Other key personnel:* (402) 628-2080
- Janelle Stansbury  Business Education
- Lynn Bowder  Art
- Greg Brousek  Social Science
- Robin Dalton  English

*Will do the following:*
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

**Program summary**
- Aligned subject areas:
  - Science, Art, Business
  - Art, Music, Social Science, English
  - Art, Music, English
  - Media, Business, Social Science
  - Others in development
- Example:
  - Explanation of the circulatory system
  - Physiology class works with Advanced Art class to design graphic illustrations
  - Advanced Information Processing class creates a multimedia folder
  - Students work in five-member teams consisting of two art students, two physiology students, and one information processing student.
### Cedartown High School

**167 Frank Lott Drive**  
Cedartown, GA 30125  
(404) 748-0499  
Radford Talley

**Other key personnel:** (404) 748-0490  
Doug Elliot Vocational  
Judy Puckett English  
Kathy Hunt Math  
Daisy Waldrep Science

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- Math, language arts, and science curricula and teaching strategies were modified to present abstract principles through classroom activities that are consistent, relevant, and mutually reinforcing.  
- Academic principles are reinforced in vocational classes.  
- Vocational and academic teachers work as a team to coordinate lesson plans.

### Chase County High School

**P.O. Box 577**  
Imperial, NE 69033  
(308) 882-4304  
Randy Vlasin

**Other key personnel:** (308) 882-4304  
Marla Smith Life Science

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- Science principles are integrated into agriculture and agricultural applications are used to demonstrate scientific concepts at both the junior high and high school levels.  
- Examples of projects include “Bottle Biology,” “Wisconsin Fast Plants,” and projects on groundwater quality.  
- Students recently worked with *National Geographic* on a water quality video to be made available to schools across the country.
### Cooper High School
3639 Koontree  
Abilene, TX 79605  
(915) 691-1000 ext 172  
Ron McQueen

**Other key personnel:** (915) 691-1000  
Kathy Dacy  
Bob Evans  
Lori Beale  
Nathan Nease  
Sallye Ortiz

**Math**

**Principles of Tech.**

**Business Comm.**

**Science**

**Comp. Appl.**

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate in panels  
- Participate in a conference

### Program summary
- Cooper Integration Team has chosen “Campus Beautification” as a project around which to align different subject areas.
- Aligned subjects:  
  - Manufacturing Graphics  
  - Environmental Science  
  - Sociology
- A team of six teachers is to continue planning additional activities for other subject areas to become involved.

### Cumby ISD
Route 2, Box 254  
Cumby, TX 75433  
(903) 994-2260  
Ronnie Stanley

**Other key personnel:** (903) 994-2260  
Pam Taber

**Math**

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate in panels  
- Participate in a conference

### Program summary
- Aligned subjects:  
  - Algebra  
  - Agriculture  
  - Home Economics
- Two Algebra and two vocational teachers use a common conference period to plan an aligned curriculum.
- The vocational teachers team-teach in the algebra classes. Math principles are also reinforced in the agriculture and home economics classes.
- A science and a language arts teacher have participated in the curriculum planning team, and these subjects are targeted for alignment in 1994 and 1995, respectively.
Eldorado High School
P.O. Box W
Eldorado, TX 76936
(915) 853-2549
Kenneth L. Newman

Other key personnel
Paige Ragsdale  English  (915) 387-2378
Maureen Hodges  Counselor  (915) 853-2408
Chris McCravey  Voc. Home Economics  (915) 853-2078

Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate in panels
- Participate in a conference

Program summary
- The production of a dinner theater for the public in spring of 1994 is the theme for curriculum alignment.
- Aligned subjects:
  - English
  - Computers
  - Drafting
  - Accounting
  - Agricultural Science
  - Art
  - Home Economics
  - Resource
- Students select an American play in English class related to the theme of "community." All aspects of the dinner theater production and presentation are coordinated in all classes.
- Eldorado was selected as a pilot school for integration.

Greenville High School
3515 Lion’s Lair
Greenville, TX 75401
(903) 457-2597
Paula Ballew

Other key personnel
Vanessa Pope  English  (903) 457-2608
Don Money  Tech. Systems  (903) 457-2590
Jan Rosenbalm  Math  (903) 457-2590
Marsha Fincher  Counseling  (903) 457-2569

Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

Program summary
- A full-year elective for freshmen and sophomores combines technical and academic curricula with hands-on learning activities.
- English, home economics, math, technical systems, chemistry, and automotive technology are combined in rotating six-week segments to demonstrate how each subject complements and is relevant to the others and to society’s needs.
- Three teachers are actively involved in teaching the class; other faculty members are used as consultants.
Grisham Middle School
10805 School House Lane
Austin, TX 78750
(512) 258-6667
Clifton Wendel

Other key personnel: (512) 258-6667
Susan Schwausch Language Arts
David Hailes Science
Karen Kamenzind Social Studies
Kay Zunker Math

Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

Program summary
- Technology is the theme that aligns curriculum across four academic subjects: science, math, language arts, and history.
- Example: Hot-Air Balloons
  - Principles of Physics
  - Square Footage, Mass, Volume
  - Interviews and Journalistic Writing
  - Civil War Use
- Teachers share a common planning period to develop projects.
- Scores on standardized tests have increased.

Hazleton Area High School
101 S. Church Street
Hazleton, PA 18201
(717) 459-3111 ext. 3125
Dr. Edward S. Lyba

Other key personnel: (717) 459-3221
Karen Jackson Communications
Cathy Hauze Communications
Steve Hametz Communications

Career Center: (717) 459-3172
Sam Morolo Masonry
Mary Makuta Health
Nancy Tkatch Foods

Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

Program summary
- Alignment occurs between academic subjects offered at the comprehensive high school and vocational subjects offered at the Career Center across the street.
- Aligned subjects:
  - English with apparel, carpentry, plumbing, cabinet making, masonry, welding, auto body, and machine shop
  - Science with health and social services
- Applied Math, Physiology, Principles of Technology, and Environmental Science also fulfill math and science requirements.
- Career paths include
  - Manufacturing
  - Building/Construction
  - Health/Human Service
  - Power/Energy
  - Office/Business/Clerical
  - Marketing
  - Cosmetology
### Hoke County High School

**Address:**
310 Wooley Street  
P.O. Box 370  
Raeford, NC 28376

**Contact:**
- (919) 875-4106  
- Jeffrey C. Moss

**Other key personnel:**
- Dan McGougan: Agriscience  
- Delia McNeill: Math  
- Gary Brigman: Integrated Teaching  
- Eleanor Gentry: Academic Plans  

**Telephone numbers:**
- (919) 875-2156  
- (919) 875-2292

**Program summary**
- Teacher teams occur in the following subject pairs:  
  - Foods/Chemistry  
  - Math/Health Occupations  
  - Science/Agriculture  
  - Math/English

- Master scheduling allows teachers to meet to develop and plan curriculum and team-teach.

- Approximately 75% of teachers are involved in teaming.

- Students in both vocational and academic classes benefit.

- Teachers meet in summer to compare and align subject competencies, goals, and teaching strategies across vocational and academic subjects.

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

### Illinois Valley Central High School

**Address:**
1300 W. Sycamore  
Chillicothe, IL 61523

**Contact:**
- (309) 274-5418  
- Susan Goodale

**Other key personnel:**
- Larry Williams: Superintendent  
- Dave Kinney: Curriculum Director

**Telephone number:**  
- (309) 274-5418

**Program summary**
- A Block 8 schedule accommodates integration. Teachers are given complete freedom to collaborate.

- Collaboration takes the form of projects and thematic units that cut across several classes.

- Goal is to develop one team-developed and taught project per course per semester.

- To date, teaming has occurred in math, science, industrial arts, business, and English classes.

- Focus is on a competency-based curriculum, which has been verified by business and industry.

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference
**Lakeview High School**  
RR 3, Box 170  
Columbus, NE 68601  
(402) 564-8519  
Dean Folkers  

*Other key personnel:* (402) 564-8519  
Robert Lake Science  

Will do the following:  
- Answer telephone questions  
- Accept visitations  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- **Aligned subject areas:**  
  - Biology, Agriculture  
- **Objectives:**  
  - Integrate agriculture and science education.  
  - Develop a working knowledge of the research process using the AgriScience institute and Outreach Program teaching materials.  
  - Develop a closer working relationship with fellow science and agriculture teachers.  
  - Teach specific agriscience laboratories and assist students in preparing their own laboratory experiments.

**Lincoln High School**  
2229 J Street  
Lincoln, NE 68510  
(402) 436-1301  
Sanford Nelson  

*Other key personnel:* (402) 436-1301  
Laurie Logsdon Business  
Judy Strand English  
Mark Scheer Principles of Tech.  
Lindal Risenhoover Industrial Tech.  
Nancy Beck Math  

Will do the following:  
- Answer telephone questions  
- Accept visitations  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- **Principles of Technology, Business Communications, Applied Math, and Applied Physics courses are team-taught.**  
- Students receive English credit for the Business Communications class, math credit for the Applied Math class, and science credit for the Principles of Technology and Applied Physics classes.  
- Teacher teams have revised curriculum material.  
- Teacher teams are provided one common planning period per day.  
- English and social studies teachers team-teach a course called American Experience.
### Montgomery County JVS
6800 Hoke Road  
Clayton, OH 45315  
(513) 837-7781  
Carol A. Gellner

**Other key personnel:** (513) 837-7781  
M. Ditmer Math  
C. Gellner Administration  
J. Carter English

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate in panels  
- Participate in a conference

---

### Mt. Diablo High School
2450 Grant Street  
Concord, CA 94520-2297  
(510) 682-4030  
Judy Moon

**Other key personnel:** (510) 682-4030  
Artie Johnson Home Economics  
Linda Pearson Home Economics  
Cynthia White Soc. Sci./English  
Nikki Boren Soc. Sci./English

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

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**Program summary**

- Vocational teachers and correlated academics teachers plan and work as a team.
- Academic teachers observe lab experiences to develop lessons directly applied to a specific occupational area.
- Skills in communications, mathematics, and science are seen by the students as tools to solve real-world problems. Conversely, real-world work becomes the methodology to teach math, communications, and science.

**Aligned subjects:**  
- Home Economics, English, Social Science

**Project theme:** Introduction to the career of international host/chef/hotel manager.

**Activities:**  
- Introduction to the cultures of the Middle East, including religion, family, and food.  
- Menu preparation representing ten different countries.  
- Explanations of food, art, and money exchange systems unique to each country.  
- Final buffet prepared by students.

- "Discovery," a 9th grade course, provides an introduction to strategies for success at the school. Local business provides guest speakers who emphasize the occupational relevance of English and math skills.
### New Richmond High School

**New Richmond, WI 54017**  
(715) 243-7458  
Tom Wells

#### Other key personnel
- **Kerry Kittle**  
  Social Science  
  (715) 243-7411
- **Sue Selbin**  
  Vocational Dept. Chair  
  (715) 243-7452
- **Steve Wojan**  
  Principal  
  (715) 243-7453

#### Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Participate in a conference

**Program summary**
- **Aligned subject areas:**  
  - English/Business Education  
  - Computers/all subjects  
  - Environmental Science/Agriculture  
  - English/Library/Special Ed./Reading/Computers

- Example:  
  A follow-up to the play *The Miracle Worker* requires students to research a wide variety of topics related to handicaps and disabilities. Findings are published as articles in magazines written by teams of three to five students.

- Teachers submit proposals for curriculum alignment and integration for minigrants.

### San Juan High School

**7551 Greenback Lane**  
Citrus Heights, CA 95610  
(916) 971-5142  
Sharlene Cossairt

#### Other key personnel:  
- **Bill Wilson**  
  English  
  (916) 971-5112
- **Don Crowl**  
  Science
- **Grant McMicken**  
  Math
- **Sally Edwards**  
  Home Economics  
  (916) 971-5129

#### Will do the following:
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

**Program summary**
- **Aligned subjects:**  
  - Home Economics, Math, Science

- "Life, Education and You" is a 9th-grade course that targets at-risk students who show an interest in home economics careers based on COPS test results.

- Enrolled students take math, science, and home economics classes together and projects cut across all subjects.

- Examples:
  - Students learned about geometric shapes and concepts in math and constructed quilts in home economics.
  - Students applied concepts about bacteria growth and sanitation learned in life science to foods and public safety in home economics.
York County Area Vocational-Technical School
2179 S. Queen Street
York, PA 17402
(717) 741-0820
Ron Arnold

Other key personnel
Tom Shelley  Metal Machining, Project Design and Emp. Coord. (717) 235-0662
Jane Schenck  English/Communications (717) 757-4757
Carl Criswell  Science (717) 244-7456

Will do the following:
• Answer telephone questions
• Accept visitations
• Visit other programs
• Speak at conferences
• Participate on panels
• Participate in a conference

Program summary
• Aligned subjects areas:
  • Math, Science, English, Metalworking
• Operates as youth apprenticeship program in metal machining technology.
• Students operate in teams within both vocational projects and academic classes.
• Problem solving is stressed through team projects, which are an ongoing and integral part of the program.
• Industry is involved as advisors, student employers, and as part of the training program.

See also:

Bryan High School
Model Eight
4700 Giles Road
Omaha, NE 68157
(402) 978-7200
Tom O’Hara

Milwaukee South Division High
Model Eight
1515 W. Lapham Blvd.
Milwaukee, WI 53204
(414) 384-9900
David Heinbuch

Muscle Shoals High School and Center for Technology
Model Two
P.O. Box 2730
Muscle Shoals, AL 35661
(205) 389-2675
Sharon Rue

Paul M. Hodgson Vocational-Technical High School
Model Five
2575 Summit Bridge Road
Newark, DE 19702
(302) 834-0100
Dr. Steven H. Godowsky

Sitka High School
Model Five
1000 Lake Street
Sitka, AK 99835
(907) 747-3263
Gayle Hammons
MODEL FIVE
SENIOR PROJECTS

Self-directed exploration and problem-solving skills are the emphasis of senior projects, which can be viewed either as an important step in students' career path selection or an in-depth research experience. In most cases, the senior project replaces electives and requires the application of vocational and academic skills and knowledge gained throughout the high school experience. Since it relies on independent work capacities such as research and experimentation techniques, along with written and oral presentation skills, schools must reshape the entire curriculum to give students adequate preparation. Topics can vary widely and are selected by the student but must be substantial enough to sustain the student's interest over a fairly long period of time. Final presentations can vary, but often take the form of a physical product, a written report, and an oral presentation, providing the student the opportunity to develop different capacities.

One teacher or teacher team takes responsibility for overseeing a student's progress on the project to ensure that the work meets the criteria for receiving graduation credit. Projects usually involve an investment of time outside of school hours, whether in the form of job site experience, research in a library or laboratory, or the production of some kind of physical product. Teachers, business persons, community members, or other adult mentors generally serve as advisors and final presentation evaluators.

Advantages

- Addresses tracking issues by benefiting all students.
- Develops independent thinking, experimentation, and problem-solving and presentation skills.
- Can address teacher isolation by encouraging teacher collaboration and innovation.
- Provides maximum flexibility for students to investigate individual interests and use particular strengths and skills.
Challenges

- Requires flexibility in graduation requirements to allow students to receive graduation credit for senior project completion.
- Requires standards and criteria for topic selection and final evaluation.
- May require curriculum changes in grades 9-11 to develop the independent problem-solving and research skills required to successfully complete a senior project.
- Requires master schedule flexibility to allow individual teachers or teacher teams to serve as advisor(s)/evaluator(s) for students.
- Requires the commitment of teacher advisor(s)/evaluator(s).

Activities

The very nature of senior projects precludes the use of the word "classroom" in this section. The focus is not what a teacher or teacher team determines for a large number of students, but, rather, what individual students determine for themselves, whether in an occupational or academic area of interest. Senior projects may

- integrate vocational and academic content and skills by providing job-site experience in one of several career clusters.* Instruction and credit are provided by certified learning coordinators at the job site. For example, English, social studies, and justice system professions are integrated in one school district's senior projects, and students are placed at the county Sheriff's Department.
- develop independent research and public speaking skills on a student-selected topic that does not necessarily represent a career focus. Formal paper research and writing fulfills one semester of senior English credit. Oral presentations are made before a panel of faculty and community members. Independent work is completed outside of school hours.

* Career or occupational clusters include several related occupations. For example, a health occupations cluster might include careers in all specializations of medicine, nursing, medical technology, and physical rehabilitation or therapy.
Often, teachers recognize that students need more specific preparation before their senior year to develop the type of independent learning skills that a senior project requires. Therefore, the curriculum in grades 9 through 11 may be changed to

- introduce students to different ways of analyzing and solving problems;
- provide experience in the use of each of the sophisticated labs and equipment that students may need for a senior project; and
- teach research, experimentation, and problem-solving techniques.

**Future Promise**

The aspect of the senior projects model that is its biggest asset is also its most difficult—its flexibility. Since there is very little formal structure involved, a senior project can be successfully completed by almost any student; but without proper preparation and supervision, the experience can be as meaningless and superficial as the worst of traditional high school experiences. Similarly, the lack of prescribed curriculum frees both teachers and students to be experimental and creative, but without sufficient assessment criteria, the final evaluation can become an administrative nightmare. Given these extremes, it is important to avoid the mistake of equating the lack of structure with a laissez-faire attitude toward planning. Growth in this model is best managed by clarifying the target student population and desired student outcomes rather than following a particular plan for the perfect senior project.

The senior project is not a simple place to begin making substantial changes for students. For this reason, schools may want to start small and expand slowly as logistical difficulties are overcome. Starting small can mean involving only one teacher or teacher team and a small pilot group of seniors who all work on one project topic as the final assignment in one class, or involving only one or two students who have the independent learning skills the project requires and whose projects are well-defined. Develop a committed team of educators to think about tough questions such as

- the kind of skills the senior project will develop,
NCRVE, MDS-768

- the kind of skills that must be developed *prior to* the senior project experience, and
- which students will benefit from the senior project and why.

The answers to these questions will then provide guidelines for discussing the following issues:

- the objectives of the project (career exploration, academic research, and so on)
- the physical and/or monetary resources required and potential sources both in the school and community
- the kind of final product that will be evaluated
- the evaluation process—the time frame and people it requires

As with Model Four, growth within this model can be looked at both quantitatively and qualitatively. If addressing tracking is a priority, more students, regardless of their postsecondary plans, can be required to complete senior projects, and more teachers can be enlisted to serve as advisors/evaluators. If the future employment needs of local business and industry are a focus, more types of projects can be considered to develop the skills future entry-level employees will need. As school-business ties develop and as other resources—monetary, physical, and human—become available, senior projects can involve job apprenticeship experiences, research in professional lab sites, and local business people who serve as project advisors/evaluators.
### Examples and Resources

#### Forest Grove High School
1401 Nichols Lane  
Forest Grove, OR 97116  
(503) 359-2432  
Jerry Fitzpatrick

**Other key personnel:** (503) 359-2432  
Al Rogers  
Vocational Education  
Phil Valett  
English  
Ginger Arnold  
Business  
Bob Beisell  
Social Studies  
Don Singer  
Computers

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- **Project focus:** Application of computer skills  
- **Requires:**  
  - A topic to be researched, using interviews and site visits.  
  - A “product” demonstrating mastery of the topic.  
  - An 8- to 10-page documented “I-search” paper.  
  - An 8- to 10-minute speech followed by a five-minute question period before a board of experts in the field to defend one’s work.

**Preparation:** Computer Instruction  
- Grade 9: keyboarding and graphing  
- Grade 10: word processing  
- Grade 11: data processing

---

#### Gov. John R. Rogers High School
12801 86th Avenue East  
Puyallup, WA 98373  
(206) 841-8722  
Fred Mertlich

**Other key personnel**  
Carlene Houghton  
Communications Chair  
(206) 841-8717

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

**Program summary**  
- **Project focus:** Post-high school plans  
- **Requires:**  
  - A research paper on a personally chosen topic.  
  - At least 15 hours of out-of-school work on a “product.”  
  - Oral report to a group of adults with expertise in the area of the chosen topic.  
- Replaces second semester of 12th-grade English.
**Onondaga-Cortland-Madison BOCES**  
307 Easterly Terrace  
Dewitt, NY 13214  
(315) 433-2604  
Dr. Steven Grossman

**Other key personnel**
- **Mrs. B. Lenta**  
  Health Professions  
  (315) 476-7461 ext. 2653
- **Mr. C. Wilson**  
  Justice Professions  
  (315) 435-2961

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

**Program summary**
- **Project focus:** Inside view of one of three broad professional fields:
  - Justice System Professions
  - Allied Health Professions
  - Aviation Professions
- **Requires:**
  - In-depth speaking and writing about the connections between schoolwork and the workplace.
  - Demonstration of socialization in the workplace.
  - Application of previously learned academic knowledge and skills to professional tasks and problems.
- **Provides:**
  - Experiential learning at one of three sites: (1) Onondaga County Sheriff’s Department, (2) Veteran’s Administration Medical Center, or (3) Hancock International Airport.
  - A learning coordinator certified to teach in the occupational field at each site.
  - Two consultants, one certified in English and one certified in social studies, to work with the learning coordinators.
### Paul M. Hodgson Vocational-Technical High School
2575 Summit Bridge Road
Newark, DE 19702
(302) 834-0100
Dr. Steven H. Godowsky

**Other key personnel:** (302) 834-0990  
Carolyn Steinwedel Special Ed./English  
Mary An Scarbrough English  
David Lutz Cabinetmaking  
(302) 834-0900

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

### Program summary
- **Project focus:** Titled “An Exhibition of Achievement,” the senior project is required of all 12th graders and integrates the vocational and academic components of their education.

- **Requires:**  
  - A faculty advisor and committee members selected by the student to coach the student throughout the senior project process.  
  - A research paper that is incorporated into the senior English class.  
  - A tangible product related to the student’s vocational program, and designed and constructed by the student.  
  - A formal, oral presentation to the student’s committee of no less than 15 minutes.  

- Surveys of senior project completers since 1990 reveal that seniors spend more time and energy on classwork and homework, and that they feel strongly challenged by the senior project process. Faculty uses more collaborative approaches to curriculum and teaching methods.
**Sitka High School**  
1000 Lake Street  
Sitka, AK  99835  
(907) 747-3263  
Gayle Hammons

**Other key personnel:** (907) 747-3263  
Randy Hughey  Vocational  
Lee Demmert  Principal  
Orienne Denslow  Asst. Superintendent  
Sarah Jones  Librarian

**Program summary**

- **Project focus:** A graduation requirement that students demonstrate knowledge of a career or vocational skill.

- **Requires:**
  - A research paper required in senior English classes.
  - A tangible product in which research is applied to manufacture a product that the student has never before attempted.
  - A speech presented to a board of teachers and community members followed by a question-and-answer period.

- Teachers throughout the school make the Senior Projects part of their curriculum, providing guidance on key elements of the project.

- In addition to the Senior Project, integration occurs in the form of integrated units developed by vocational/academic teacher teams. Examples include
  - Fisheries and computers
  - Alaska history and entrepreneurship
  - Alaska geography and tourism
  - Wood shop and algebra

**Will do the following:**

- Answer telephone questions
- Accept visitations
- Speak at conferences
- Participate on panels
- Participate in a conference
MODEL SIX
THE ACADEMY MODEL

Operating as schools-within-schools, academies provide the following three unique components: (1) *block rostering*, which allows each entering class of students to take core subjects together with the same teachers; (2) *long-term relationships* with core teachers, who teach the required core subjects for all academy students every year; and (3) *formal business ties*, which provide the real-world basis for the occupational focus of the academy as well as sources of mentors, internship experiences, and potential postsecondary employment opportunities. There are usually four core teachers who are responsible for teaching English, math, science, and the occupational area. Examples of occupational areas for existing academies are electronics, automotive and mechanical sciences, health, media, agriculture, business, and computers. Students take other subjects with non-academy students in the regular high school. Because of the block rostering, these teachers are regularly able to plan and implement curriculum in collaboration with each other—that is, they make frequent use of the horizontal alignment strategy described in Model Four. Block rostering also results in shared planning periods that are built into the academy structure, a feature that facilitates frequent and consistent teacher communication about student progress and problems or pedagogical ideas. Therefore, academies are also particularly well-suited to working with underachieving students or those at risk of dropping out. Core teachers feel a collective responsibility to address the special needs of these students.

**Advantages**

- Addresses problem of teacher isolation by providing common planning periods and encouraging frequent and consistent horizontal alignment.

- Addresses needs of many underachieving or at-risk students by providing a "family" structure in which core subjects are taught by the same core teachers every year, and class sizes are smaller.

- Provides formal ties between business and schools to benefit both students and future employers.
Horizontal alignment between all subjects, not just one vocational and one academic subject, is easily accomplished and benefits all academy students.

Challenges

- Cost: smaller classes, release time for teacher planning and collaboration, and developing and maintaining ties with business can add an additional $1,000 per student to the amount already being spent.
- May reinforce tracking of students if target population is potential dropouts because the academy formally establishes differences between its students and those in the regular high school.
- Requires flexibility of master schedule to accommodate coordination of block rostering and core teacher planning periods.
- Requires high levels of sustained commitment, coordination, and communication from core teachers.
- Small class sizes mean that only a small number of students can benefit.

Classroom Activities

All of the strategies discussed under Models One through Four can and do take place in academy classrooms. Senior projects (Model Five) can also be incorporated into an academy model. Academy teachers may

- easily integrate vocational relevance into academic classes and academic competencies into vocational classes. For example, the English teacher can present vocabulary and reading assignments related to the academy’s occupational area; math and science teachers can coordinate the order and pace of their classes to match that of the vocational class; and the vocational teacher can expect certain academic principles to have already been covered.
- develop special projects or themes that cut across all core subjects. For example, students in a media academy read Shakespeare’s *Julius Caesar* in English, learn
about Roman civilization in World Cultures class, study Roman technological contributions in Science, and write news stories about the death of Caesar in Journalism class.

Academies may

- target at-risk student populations or middle to high-middle populations depending on its objectives. For academies that try to help at-risk students, there has been substantial evidence that the academy model reduces dropout rates and increases postsecondary education enrollment. For academies that aim at the second population, this type of model meets the needs of students who respond to a less abstract instructional format than a traditional college track provides.

- work closely with a major local employer to provide mentors, tours of facilities, summer internships, and other regular contact with role models outside of the school.

**Future Promise**

A useful way to think about growth in this model is in terms of the following two questions:

1. How are we serving the students we already have?
2. How do we reach the students we don't have?

Usually, the first must be addressed when assessing an academy’s performance in its early years. At this point in its development, the barriers that academies face are often related to the difficulties of team building and instituting change. Successful academies rely on teacher collaboration and horizontal alignment. These are wonderful mechanisms for creating positive change for both teachers and students when teachers and administrators are committed. However, they rely on consensus, something that discussions of educational reform do not naturally build. Strong leaders who can bring disagreements away from turf wars or control issues and back to the objective of benefiting the target student population as well as investing in staff development programs that address consensus and team building are essential.
Addressing the second question, academies generally considered successful at what they are doing for the students they serve often seek to enlarge their enrollment or add other teachers and academic subjects to the core group. To a certain extent, this kind of growth may be undesirable because one academy is limited by its single occupational focus and the number of vocational teachers available to participate. In addition, increases in student enrollment may lead to larger class sizes, an outcome that decreases the unique ability of an academy to serve its students well. Therefore, schools may find that their success with an academy leads them to develop into a magnet school (Model Seven) or a school with several occupational clusters,* each of which acts like an academy (Model Eight).

* Occupational clusters include several related occupations. For example, a health occupations cluster might include careers in all fields of medicine, nursing, medical technology, and physical rehabilitation or therapy.
## Examples and Resources

### Farrington High School

**Address:** 1564 N. King Street, Honolulu, HI 96817  
**Phone:** (808) 848-0846  
**Principal:** Mary Ann Ishikane

**Other key personnel:**  
- Lillian Chang, English  
- Bryan Yamashita, Social Studies  
- Carol Fujita, Science  
- Mary Ann Ishikane, Health Occupations  
- Bernard Williams  
- Lauri Wong, Deputy Dist. Sup’t.  
  
**Will do the following:**  
- Accept telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference

### Florin High School

**Address:** Career-Vocational Education, 8820 Elk Grove Blvd., Elk Grove, CA 95624  
**Phone:** (916) 686-7726  
**Principal:** Christy Moustris

**Other key personnel:**  
- Judi Brown, Business  
- Mark Macres, Social Studies  
- Spider Thomas, Math  
- Bakari Chavanu, English  

**Will do the following:**  
- Answer telephone questions  
- Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate in panels  
- Participate in a conference

### Program summary

- **Academy focus:** Health Occupations  
- **Core academics:**  
  - English  
  - Science  
  - Social Studies  
- **Vocational subject:** Health Science  
- **Students receive real-world work experience at local major medical and health providers.**

- **Academy focus:** Business, Education, and Technology (BET)  
- **Core academics:**  
  - Social Studies  
  - English  
  - Math  
- **Occupational subject:**  
  - Business Technology, which includes computers, word processing, and marketing  
- **Internships, job shadowing, and a Regional Occupational Program provide on-site work experiences at**  
  - Elk Grove School District  
  - Pepsi-Cola  
  - Allstate Insurance  
  - California Internal Revenue Service
<table>
<thead>
<tr>
<th><strong>Hanford High School</strong></th>
<th><strong>Program summary</strong></th>
</tr>
</thead>
</table>
| 120 E. Grangeville Boulevard  
Hanford, CA 93230  
(209) 582-4407  
Gale Cluff | - Five academies:  
  - Communication Arts  
  - Engineering Science and Technology  
  - Agricultural Science/Business Technology  
  - Liberal Arts  
  - Entrepreneurial Business |
| **Other key personnel:** (209) 582-4407  
Leonard DeRuiter, Ag. Science  
Dr. J. C. Taylor, Chemistry  
Susan Moran, Biology  
Rod Althouse, Social Science  
Ashley Cross, English | - Smaller student groups stay longer with common teachers in a "family" structure, which allows the building of bonds.  
- An interdisciplinary academic core, common to all academies, builds the foundation for a meaning-centered curriculum. |
| **Will do the following:** | |
| - Answer telephone questions  
- Accept visitations  
- Speak at conferences  
- Participate on panels  
- Participate in a conference | |

<table>
<thead>
<tr>
<th><strong>John C. Fremont High School</strong></th>
<th><strong>Program summary</strong></th>
</tr>
</thead>
</table>
| Media Academy  
4610 Foothill Road  
Oakland, CA 94601  
(510) 534-4381  
Michael Jackson | - Academy focus:  
Media/Telecommunications  
- Core academics:  
  - English  
  - Social Studies  
  - Science  
- Vocational subjects:  
  - Newspaper  
  - Magazine  
  - Broadcasting  
- Students produce award-winning newspaper, magazine, and television features using desktop publishing and television studio equipment.  
- Students are placed in summer internships in media-related fields.  
- College and career-preparatory program for at-risk students. |
| **Other key personnel:** (510) 261-3240  
Steve O'Donoghue, Journalism  
Aura Garcia, Science  
Gwen Black, Social Studies  
Sandy Collins, Broadcasting | |
| **Will do the following:** | |
| - Accept visitations  
- Visit other programs  
- Speak at conferences  
- Participate on panels  
- Participate in a conference | |
<table>
<thead>
<tr>
<th>Lafayette High School</th>
<th>Program summary</th>
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<tbody>
<tr>
<td>Health &amp; Medical Technology Institute</td>
<td>Academy focus: Health Occupations</td>
</tr>
<tr>
<td>2630 Benson Avenue</td>
<td>Core academics:</td>
</tr>
<tr>
<td>Brooklyn, NY 11214</td>
<td>- English</td>
</tr>
<tr>
<td>(718) 372-3480 ext. 2400</td>
<td>- Social Studies</td>
</tr>
<tr>
<td>Marjorie Goldberg, R.N.</td>
<td>- Math</td>
</tr>
<tr>
<td>Other key personnel: (718) 372-3480</td>
<td>Vocational subject: two-year Health Occupations Core Course</td>
</tr>
<tr>
<td>M. Wade</td>
<td>All students are required to complete 108 hours of hands-on, clinical experience in a local healthcare agency.</td>
</tr>
<tr>
<td>D. Weiser</td>
<td>Graduating students are prepared for Nursing Assistant and/or Emergency Medical Service certification.</td>
</tr>
<tr>
<td>E. Moshel</td>
<td></td>
</tr>
<tr>
<td>M. Bernstein</td>
<td>Asst. Principal, Science</td>
</tr>
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<td>Will do the following:</td>
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<td>- Answer telephone questions</td>
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<td>- Accept visitations</td>
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<td>- Visit other programs within 100 miles</td>
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<td>- Speak at conferences</td>
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<td>- Participate in a conference</td>
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<tr>
<td>Socorro High School</td>
<td>Program summary</td>
</tr>
<tr>
<td>12300 E. Lake</td>
<td>Academy focus: Health Occupations</td>
</tr>
<tr>
<td>El Paso, TX 79927</td>
<td>Core academics:</td>
</tr>
<tr>
<td>(915) 860-3440</td>
<td>- English</td>
</tr>
<tr>
<td>Carl Cooper</td>
<td>- Math</td>
</tr>
<tr>
<td></td>
<td>- Science</td>
</tr>
<tr>
<td></td>
<td>- History</td>
</tr>
<tr>
<td>Other key personnel: (915) 860-3440</td>
<td>Vocational subject: Health Occupations, which includes a 9th grade healthcare science course, a 10th grade lab/career explorations course, an 11th grade two-hour clinical rotation class at a local hospital, and a 12th grade co-op work experience at a local hospital.</td>
</tr>
<tr>
<td>Jan Kehoe</td>
<td>The academy program is articulated with the local community college and provides nine hours of credit.</td>
</tr>
<tr>
<td>Nancy Sochat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Will do the following:</td>
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<td>- Answer telephone questions</td>
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<td>- Accept visitations</td>
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<td>- Visit other programs</td>
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<td>- Speak at conferences</td>
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<td></td>
<td>- Participate in panels</td>
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<td></td>
<td>- Participate in a conference</td>
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<tr>
<td>Woodside and Carlmont High Schools</td>
<td>Program summary</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Sequoia Union High School District</td>
<td>• Academy focus: Business Technology</td>
</tr>
<tr>
<td>480 James Avenue</td>
<td>• Core academics:</td>
</tr>
<tr>
<td>Redwood City, CA 94062-1098</td>
<td>• English</td>
</tr>
<tr>
<td>(415) 369-1411 ext. 327</td>
<td>• Math</td>
</tr>
<tr>
<td>Marilyn Raby</td>
<td>• Science</td>
</tr>
<tr>
<td></td>
<td>• Social Studies</td>
</tr>
<tr>
<td><strong>Other key personnel:</strong> (415) 364-3902</td>
<td>• Vocational subject: Business</td>
</tr>
<tr>
<td>Ben Stein Business Technology</td>
<td>• Students have frequent contact with</td>
</tr>
<tr>
<td>Kathleen Dolle English</td>
<td>industry through field trips, invited</td>
</tr>
<tr>
<td>Suzanne Rehmus Social Studies</td>
<td>speakers, and individual mentors.</td>
</tr>
<tr>
<td></td>
<td>• Summer job opportunities are made</td>
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<tr>
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<td>available to students on track for</td>
</tr>
<tr>
<td></td>
<td>graduation after the 11th and 12th</td>
</tr>
<tr>
<td></td>
<td>grades.</td>
</tr>
<tr>
<td><strong>Will do the following:</strong></td>
<td>• Evaluation reveals a statistically</td>
</tr>
<tr>
<td>• Answer telephone questions</td>
<td>significant positive impact on</td>
</tr>
<tr>
<td>• Accept visitations</td>
<td>attendance, grades, units of credit</td>
</tr>
<tr>
<td>• Visit other programs</td>
<td>earned, graduation rate, and enrollment</td>
</tr>
<tr>
<td>• Speak at conferences</td>
<td>in postsecondary education.</td>
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<tr>
<td>• Participate on panels</td>
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<tr>
<td>• Participate in a conference</td>
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</tbody>
</table>

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MODEL SEVEN
OCCUPATIONAL HIGH SCHOOLS AND MAGNET SCHOOLS

These schools are much like an expanded academy model (Model Six) except that the focus, generally but not necessarily an occupational cluster,* incorporates the entire school rather than just a subset of it. Because the school's theme is explicit, all kinds of crossdisciplinary connections can be made. These include connections between specific careers that fall within the larger occupational theme of the school as well as those between all vocational and academic subjects. Occupational high schools represent an older generation of schoolwide specialization. Magnet schools, a more recent variation originally intended to be a mechanism for ensuring racial desegregation, do not necessarily have an occupational focus, although many of them do, like computer magnets, business magnets, or electronics magnets. Other possibilities of this type include arts and science magnets, schools centered around environmental issues, or other issues-based schools. While both occupational and magnet schools provide the institutional organization that allows a great deal of integration to occur, neither can force integration to exist where individuals are not committed to it.

Advantages

- Schools have clear focus and mission, which can build bridges across traditional divisions between vocational and academic subjects, teachers and students, and schools and the communities they serve.
- Provides structural support for extensive teacher collaboration and communication to increase integration between vocational and academic subjects.
- Occupational focus emphasizes strong vocational and academic skill training for successful school-to-work transition.
- Non-occupational magnet schools address tracking issues by benefiting all students regardless of postsecondary plans.

* Occupational clusters include several related occupations. For example, a health occupations cluster might include careers in all fields of medicine, nursing, medical technology, and physical rehabilitation or therapy.
Course selection and scheduling can be greatly simplified by using organized sequences of courses related to specific career paths or issues.

**Challenges**

- Requires a large school district (five to ten secondary schools) that can provide adequate student choice between magnet/occupational school programs or between magnet and comprehensive school programs.
- Requires a faculty and staff committed to collaboration and communication between vocational and academic departments.
- Non-occupational magnet schools may not incorporate integration of vocational and academic subjects.
- Occupational focus requires academic teachers to adopt good vocational pedagogical techniques.
- Can appear to reduce postsecondary options for students due to the particular occupational or issue focus of the school but not if the focus is broad enough (e.g., “Manufacturing Technology” vs. “Welding”).

**Classroom Activities**

Students who are entering an occupational or magnet school may need preparation before making the choice of a particular secondary school. Therefore, many districts require students in grades K-8 to

- take short courses or modules related to all occupational specialties offered in secondary schools in grades six and seven (sometimes earlier), then a more intensive form of career exploration in grade eight.
- take standardized career interest or aptitude and personality profile tests in grade eight that are evaluated by a trained career counselor.
Secondary teachers may

- use master curriculum plans to increase opportunities for informal collaboration. These are displayed in a common area such as the teachers' lounge so that all teachers can see what any teacher is covering at any one time.

- incorporate career goals and related applications in all academic classes in an occupationally focused school.

In addition, all activities listed under Models One through Five can be used.

**Future Promise**

At a school district level, growth within this model is accommodated by developing additional magnet schools that focus on other occupational clusters or issues. Because all teachers and course offerings in any one magnet or occupational school must be united around an explicit theme, this kind of expansion should be undertaken only after careful consideration of the student outcomes that are sought. If preparation for entry-level occupations is a priority, potential occupational clusters must be developed with an eye toward future job market needs in the local economy and expected shifts. If tracking and student diversity issues are to be addressed, teachers and administration must build consensus around this goal as well as the methods by which the goal is to be attained. Regardless of the desired student outcomes, the success of schools within this model depends on the level of commitment among faculty and staff to the school's stated focus and its implementation. While there can be much encouragement of collaboration and integration between vocational and academic teachers and curricula, there is not much room for conflict or disagreement at the level of a school's purpose or objectives.
Examples and Resources

<table>
<thead>
<tr>
<th>Waipahu High School</th>
<th>Program summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>94-1211 Farrington Highway</td>
<td>Occupational focus: Business careers</td>
</tr>
<tr>
<td>Waipahu, HI 96797</td>
<td>Partnerships with business provide real-world learning experiences in the following programs and courses:</td>
</tr>
<tr>
<td>(808) 677-0101</td>
<td>- Travel Industry Practicum</td>
</tr>
<tr>
<td>Jean Miyahira</td>
<td>- Telecommunications</td>
</tr>
<tr>
<td></td>
<td>- Accounting/Banking Investment Management</td>
</tr>
<tr>
<td></td>
<td>- Entrepreneurship</td>
</tr>
<tr>
<td></td>
<td>Teachers develop and implement these integrated courses.</td>
</tr>
<tr>
<td></td>
<td>Articulation agreements with Leeward Community College allow high school students the opportunity to receive postsecondary course credits.</td>
</tr>
</tbody>
</table>

Other key personnel

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milton Shishido</td>
<td>Bus/Educ. Partnership</td>
<td>(808) 677-0741</td>
</tr>
<tr>
<td>Lillian Yonamine</td>
<td>Career Planning</td>
<td>(808) 671-0538</td>
</tr>
<tr>
<td>Elena Bumanglag</td>
<td>Articulation</td>
<td>(808) 455-0296</td>
</tr>
</tbody>
</table>

Will do the following:

- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference
MODEL EIGHT

OCCUPATIONAL CLUSTERS,* CAREER PATHS, AND OCCUPATIONAL MAJORS

Occupational clusters, career paths, and occupational majors can be found in both comprehensive high schools with substantial vocational course offerings and specialized vocational schools. This model can facilitate the extensive integration of vocational and academic subjects in many ways. In some schools, traditional vocational and academic departments are eliminated and replaced by occupational departments, each with a structure similar to that used in the academy model (Model Six). Each department has assigned to it vocational teachers, who represent the particular occupational cluster’s focus, as well as English and math teachers, plus some combination of science and social studies teachers. This structure reduces conventional boundaries between vocational and academic teachers and greatly improves collaboration and alignment efforts.

In schools that retain conventional vocational and academic departments, integration can be more easily achieved through the use of “matrix structures.” In this case, occupational “paths” cut across departments, and students select a path that determines a particular matrix of courses upon entering the school. Teachers are both members of a conventional vocational or academic department and of an occupational path. They meet regularly in these paths as well as in their conventional departments, providing an important place for crossdiscipline discussion.

Whether or not conventional departments exist, two essential components of this model are student choice and career counseling. Students choose an occupational department (or cluster, path, or major) with the help of standardized career aptitude tests and career counselors upon entering the school. Examples of such departments or paths include business and marketing; agriculture; social, human, and governmental services; construction; health sciences; art and communication; transportation; and industrial technologies and engineering.

* Occupational clusters include several related occupations. For example, a health occupations cluster might include careers in all fields of medicine, nursing, medical technology, and physical rehabilitation or therapy.
Ideally, career exploration begins in elementary school and continues in middle school to help students begin the process of thinking about postsecondary options and plans. The secondary student's choice prescribes a sequence of courses that fulfills both entry-level vocational job skill needs and academic graduation requirements. This prescriptive approach to course selection accomplishes the following two innovative goals: (1) course scheduling is greatly simplified, reducing this part of the traditional guidance counselor's job, and freeing counselors to spend more time on career and crisis counseling instead; and (2) provides coherent sequences of related courses for students, who are required to consider seriously their postsecondary options and plans throughout their high school careers. The student's cluster or path choice is by no means irreversible, and students are not locked in to only one choice. However, changing occupational clusters becomes more difficult as time goes on, and career counselors lead students through discussions designed to make any change an informed decision.

**Advantages**

- Addresses traditional barriers between vocational and academic teachers by providing a formal structure that creates bridges of communication and collaboration (Model Two) and can allow extensive curriculum alignment (Model Four).

- Addresses tracking issues by emphasizing both vocational and academic preparation for all students regardless of postsecondary plans.

- Reduces traditional course scheduling task for guidance counselors by prescribing specific course sequences based on student career path choices.

- Provides integrated and coherent sequences of courses for students to encourage focused thinking about postsecondary options.

- Provides rationale and opportunities for formal ties between secondary schools and local business and postsecondary institutions that are future employers and/or future educational sites for students.
Challenges

- Almost always leads to the use of career exploration and guidance that begins earlier than the ninth grade.
- Requires extensive guidance staff development and reduction of administrative tasks to ensure students receive adequate career counseling.
- Is unsuitable for comprehensive high schools that no longer provide any vocational courses; requires a school that provides substantial course offerings in several occupational clusters.
- Requires teacher commitment to ensure that vocational and academic collaboration and alignment take place.
- May introduce tension between vocational and academic teachers within any one occupational department or cluster regarding the proper balance of vocational skills and academic content.
- Requires academic teachers to incorporate career-related information and applications (the best of vocational pedagogy) and vocational teachers to emphasize academic competencies.

Classroom Activities

To help students select appropriate occupational paths, students are required to

- take the equivalent of a year-long Career Technology course in their first year. This can be in the form of a series of modules or rotations devoted to each of the occupational departments or paths offered at the school to expose students to the variety of specific careers that are available.
- meet with career counselors who are able to administer and evaluate standardized career aptitude and personality profile tests as well as guide students through the self-questioning process that clarifies postsecondary options, particularly when a student wishes to change departments or clusters.
• read and understand brochures describing each occupational department or path offered, the sequence of courses required for graduation in each, as well as the potential entry-, middle-, and professional-level occupations within each path and the typical college majors associated with each.

• attend regularly scheduled career path activities, which include talks given by local business and industry representatives, tours of local facilities, visits to postsecondary institutions with related programs of study, and discussions of various occupational profiles within a given cluster or path.

• develop a career portfolio, which follows their progress through a career path and contains examples of work associated with their career cluster as well as all of their major activities.

To encourage integration and alignment efforts, teachers may be required to

• meet according to occupational departments or paths rather than, or in addition to, conventional departments to facilitate crossdisciplinary discussion.

• place greater emphasis on occupational applications and skills. For example, English courses focus on workplace communication skills (résumé writing, interviewing, team building, and task division) or literature that looks at different kinds of work and workers; math teachers can be assigned as a liaison to vocational teachers to address basic skill needs and problems; social studies teachers can focus on the historical influences of work and technological advances.

• place greater emphasis on academic competencies and skill remediation in vocational classes. For example, vocational teachers may take advantage of regular meetings with English teachers to develop a Writing Across the Curriculum project.

In addition, senior projects (Model Five) can be required, and all activities listed under Models One through Four and under the academy model and magnet schools model (Models Six and Seven) are equally appropriate.
Future Promise

With its emphasis on career exploration, information, and choice, Model Eight is particularly appropriate for developing close ties with local business and industry as well as postsecondary educational institutions via Tech Prep. In doing so, schools that opt for this model must remain flexible to input from this group in order to continue to give students relevant preparation for postsecondary lives. Business and industry can play useful roles for schools at every step of development, from the selection of career clusters and occupational paths to be offered, to expected job market changes that will affect career counselors’ discussions with students, to the development of various reward programs for students who achieve at high levels. It is important, however, that the relationship between schools and business focus on a commitment to students and their future contribution to business rather than the amount of time and resources that business can give to schools.

From the perspective of the integration of vocational and academic curricula, the use of occupational clusters or paths also provides excellent structural support for extensive communication, collaboration, and alignment. As the innovations of this model become stable and permanent, however, energy and excitement about the potential of the new program may be replaced by tension and doubt. One important source of tension to be addressed is the appropriate balance of emphasis on vocational versus academic content within each cluster. Before polarization and entrenched positions can develop, strong leadership must build consensus around the desired student outcomes and a system of required, regular opportunities for trust and communication across traditional subject divisions. Only through a shared sense of ownership in the structural changes that are designed to produce changes in student outcomes can growth in the model continue.
### Benson High School

**5120 Maple Street**  
*Omaha, NE 68104*  
*(402) 554-6600*  
Cheryl Hartzell

**Other key personnel:** *(402) 554-6600*
- Jan Greiner: Physics/Technology
- Dee Grindle: Tech Prep/Business
- William Chaney: Special Education
- Bette Norton: Guidance

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

### Program summary
- Three career paths:
  - Business/Management/Communications
  - Arts/Human Services
  - Technology/Engineering
- Faculty and staff are represented in all career paths and meet in path groups as well as in traditional subject departments.
- 9th-graders begin career exploration in a required course, Success Strategies, which is team-taught by one English and one social studies teacher. Career paths are selected at the end of this course.
- Each path provides a list of recommended elective courses specific to each path in addition to courses required for graduation.

### Bryan High School

**4700 Giles Road**  
*Omaha, NE 68157*  
*(402) 978-7200*  
Tom O’Hara

**Other key personnel:** *(402) 978-7200*
- Scott Kolb: Science
- Jan Hess: Business
- Crystal Kolb: Home Economics
- Jerry Olson: Science
- Sue Schrodt: Guidance

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

### Program summary
- Five career clusters:
  - Business/Information Systems
  - Health Services
  - Public/Human Services
  - Industrial/Engineering Technology
  - Art and Humanities
- Faculty are represented in all career clusters and meet in clusters as well as in traditional subject departments.
- "Write Stuff" program trains teachers in all subjects to develop assignments that integrate and improve writing skills of all students.
- Curriculum alignment team meets to develop horizontally and vertically aligned course sequences for all clusters.
Chopticon High School
Route 242
Morganza, MD 20660
(301) 475-5655
John Ryan

Other key personnel: (301) 475-5655
Joe Baker Tech Instructor
Joe Guffey Career Counselor
Karen Ensminger Applied Math
Tom Barnes Applied Science
Stephen Olczak Tech Center Principal
(301) 475-5501

Will do the following:
• Answer telephone questions
• Accept visitations during pre-approved periods only
• Visit other programs
• Speak at conferences
• Participate on panels
• Participate in a conference

Program summary
• Four career clusters:
  • Applied Bus./Mgmt. Technologies
  • Applied Eng./Mech. Technologies
  • Applied Health/Human Services Tech.
  • Humanities/4-Yr. College & Univ.
• Each cluster offers several areas of specialization.
• Technology, math, science, and communications courses are integrated in required, sequenced courses in each career cluster.
• Recent outcome assessment reveals
  • Enrollment increase between 1989/1990 and 1993/1994 in English CP/AP and Math CP/AP of 171% and 320% respectively.
  • Highest scores in school history on state academic competency tests.
  • Decrease in dropout rate from 7.7% in 1987/1988 to 1.6% in 1992/1993.

Milwaukee South Division High
1515 W. Lapham Boulevard
Milwaukee, WI 53204
(414) 384-9900
David Heinbuch

Other key personnel: (414) 384-9900
Jerry Deleeuw Manufact. Ind. Ed.
Rick Anderson Math
Colette Ruzinski English
Kathie DeVillers Computers/Science

Will do the following:
• Answer telephone questions
• Accept visitations
• Visit other programs
• Speak at conferences
• Participate on panels
• Participate in a conference

Program summary
• Three career clusters:
  • Business
  • Family and Consumer
  • Hospitality Management
• Four subject areas are completely integrated with blocked, flexible scheduling. No bells interrupt the time block.
• Manufacturing provides the vocational focus for thematic units that are team-taught.
• Staff shares a common planning period to develop new curriculum and projects.
Norfolk Public Schools
800 E. City Hall Avenue
Norfolk, VA 23501
(804) 441-2957
Jane C. Hosay

Other key personnel: (804) 441-2957
Esther G. Bailey Coordinator, Bus./Mktg. Careers
James R. Doyle Coordinator, Eng./Tech. Careers
Sharalyn L. Midgett Coordinator, Health/Human Svcs. Careers
Toni Y. Portlock Asst. Principal B.T. Washington H.S.
(804) 441-2443
Elizabeth Bortnick Head Guidance Counselor Lake Taylor H.S.
(804) 441-5650

Program summary

- Four career clusters:
  - Business/Marketing
  - Engineering/Technical
  - Fine Arts
  - Health/Human Services

- All vocational faculty receive training to give instruction in reading and writing as well as in vocational area.

- Effective guidance program begins in eighth grade and includes a course called “Careers and You,” standardized aptitude testing, and individual counseling with students and parents.

- Career path selection prescribes specific sequences of vocational and academic (including applied academics) courses to meet graduation requirements.

- Collaboration between vocational and academic teachers is funded by minigrants and takes place via class exchanges; week-long, team-taught projects; and entirely team-taught courses.

Will do the following:

- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference
### Sussex Technical High School

**Route 9, P.O. Box 351**  
Georgetown, DE 19947  
(302) 856-2541  
Carol C. Schreffler

#### Other key personnel
- Patrick Savini  
  Scheduling  
  (302) 856-0961
- George Frunzi  
  Conversion from Shared to Full Time  
  (302) 856-2541

**Program summary**
- Four career paths:  
  - Automotive/Diesel Technologies  
  - Business Technologies  
  - Health/Human Services  
  - Industrial/Engineering Technologies
- Career cluster teams include technical and academic faculty, counselors, and administrators and are responsible for integration and curriculum delivery within each cluster.
- Students select career clusters after a freshman-year Introductory Technical Programs course in which students experience sample projects in all career paths.
- Career path selection prescribes grades 10 through 12 sequences of courses, which include applied academics curricula.

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate on panels
- Participate in a conference

### Valley High School

**8820 Elk Grove Boulevard**  
Elk Grove, CA 95624  
(916) 686-7726  
Christy Moustris

#### Other key personnel: (916) 689-6500
- Elaine Clark  
  English
- Deb Melveldt  
  Health

**Program summary**
- One career cluster:  
  - Health Careers
- Cluster subject areas include  
  - English  
  - Social Studies  
  - Science  
  - Health
- Faculty share common planning period to develop themes and learning activities.
- Other faculty include  
  - Math  
  - Drama
- Additional clusters being considered for implementation.

**Will do the following:**
- Answer telephone questions
- Accept visitations
- Visit other programs
- Speak at conferences
- Participate in panels
- Participate in a conference
See also:

Hazleton Area High School
Model Four
101 S. Church Street
Hazleton, PA 18201
(717) 459-3111 Ext. 3125
Dr. Edward S. Lyba
The National Center for Research in Vocational Education (NCRVE) was established to engage in applied research and development in the area of vocational education and to provide dissemination and training. It is located in the Graduate School of Education at the University of California at Berkeley and functions in collaboration with the following sites: University of Illinois at Urbana-Champaign; University of Minnesota; RAND; Teachers College, Columbia University; Virginia Polytechnic Institute and State University; and the University of Wisconsin-Madison.

**Type of Assistance**

**RESEARCH**

The primary function of NCRVE is to provide research and development, as well as dissemination and training activities in the area of vocational education and related subjects. NCRVE research activities include, but are not limited to, applied research into the nature of work, the relationship between work and learning, and the learning process itself.

**NATIONAL RESOURCE ROSTERS**

The National Roster of Local Practices in the Integration of Vocational and Academic Education provides a list of schools that have implemented one or more integration models. A database contains site names, program summaries, state directors, and key personnel.

The roster and database enable NCRVE to respond to the need for a national network of experienced professionals who are willing to share their expertise regarding implementation of vocational and academic integration.


**OFFICE OF SPECIAL POPULATIONS**

The Office of Special Populations maintains a database to provide assistance with Tech Prep and integration program implementation issues related to special populations. The database includes publications (e.g., newsletters, journals, state-produced materials) and listings of educational information and service centers, along with organizations and professionals working with special populations.

The office conducts an annual search for exemplary vocational programs serving special populations. In 1994, exemplary career counseling programs, including the counseling component of Tech Prep programs, will be targeted. Exemplary program information is disseminated through conference presentations, publications, and the office's database.

For more information

Product Catalogs containing lists of all recent materials produced by NCRVE are available from NCRVE Materials Distribution Service, Western Illinois University, Horrabin Hall 46, Macomb, IL 61455 or by calling (800) 637-7652. The e-mail address is msmds@uxa.ecn.bgu.edu (Internet).

Information and application forms for the Integration Roster may be obtained from Laurie Holland at (510) 643-6317.

Customized, printed listings from the database may be obtained from Laurie Holland at (510) 643-6317.

Information on the Tech Prep Roster may be obtained from Darrel Clowes. The telephone number for NCRVE at Virginia Polytechnic Institute and State University is (703) 231-5982.

Information on available database search topics or customized searches and about the annual search for exemplary programs may be obtained from Zipura Burac Matias at (217) 333-0807.
**Type of Assistance**

**GENERAL OUTREACH**

NCRVE provides general outreach services assisting schools, school districts, and other educational agencies with workshops, conferences, professional development institutes, teleconferences, and other strategies that will help them integrate vocational and academic education programs and to implement Tech Prep programs. Teleconferences are held each year and directly connect the field to research. NCRVE will also provide assistance to educational agencies planning conferences, workshops, or other related activities by connecting conference planners to speakers and other available resources. However, NCRVE is not able to fund workshop activities themselves.

**TARGETED OUTREACH AND NETWORKING ACTIVITIES**

NCRVE will annually select up to five school sites, school districts, or consortia of secondary and postsecondary schools to provide extensive services. These services will include, but are not limited to, direct research support, assistance with implementation of integration of vocational and academic education and Tech Prep, and networking activities with other sites actively engaged in the implementation of integration and Tech Prep programs.

NCRVE also annually selects up to five school sites, school districts, or postsecondary institutions that form a *Network of Innovation Sites*. These sites have a recognized history of accomplishment with the integration of vocational and academic education and/or Tech Prep. Networking will be accomplished through a newsletter, electronic mail, and regional meetings.

The Office of Special Populations maintains a network of state-level administrators of special populations programs that focuses on the implementation of the 1990 Perkins Amendments.

**INSTITUTES**

**National Summer Institutes**

Through Carl D. Perkins funds, NCRVE financially supports summer institutes for staff development on the integration of vocational and academic education and Tech Prep for urban school districts. NCRVE uses a competitive process to select school sites to participate in the summer institutes.

**Regional Institutes**

NCRVE also assists educational organizations interested in providing regional institutes for staff development on the integration of vocational and academic education and Tech Prep. NCRVE staff will provide an array of non-financial assistance to those interested in providing staff development, including but not limited to, helping arrange for speakers or presenters, suggesting material and instructional supplies for the institute, and assisting with logistical problems.

**CONSORTIUM FOR PRODUCT QUALITY**

The National Consortium on Product Quality in Vocational Education will establish standards for exemplary curriculum and instructional products designed for secondary and postsecondary vocational education programs; and will identify, certify, and disseminate exemplary products.

For more information

Help with workshops, conferences, or other general outreach activities may be obtained from the Director of the National Network for Curriculum in Integration and Tech Prep at (510) 642-3824.

Information on participating in National Teleconferences, AVA Preconferences, and professional development institutes may be obtained from Susan Faulkner, Virginia Polytechnic Institute and State University, at (703) 231-7337.

Information on targeted outreach and networking activities may be obtained from the Director of the National Network for Curriculum in Integration and Tech Prep at (510) 642-3824.

Information on special populations networking activities may be obtained from Zipura Burac Matias at (217) 333-2603.

Information on the summer institutes may be obtained from Ruth Katz at (800) 762-4093.

Information on the regional institutes may be obtained from the Director of the National Network for Curriculum in Integration and Tech Prep at (510) 642-3824.

Information on the Consortium may be obtained from Margaret Ellibee, University of Wisconsin, at (608) 263-3679.
LIST OF OTHER NCRVE PRODUCTS

NCRVE offers a variety of products that fall into the following seven general categories:

1. Informational Materials
2. Economic Context
3. Institutional Context
4. Curriculum and Pedagogy (including Integrating Vocational and Academic Education, Tech Prep, Literacy, and Guidance and Counseling)
5. Students (including Special Populations)
6. Personnel
7. Accountability and Assessment

A complete listing of all available products can be requested from

Materials Distribution Service
Western Illinois University
46 Horrabin Hall
Macomb, IL 61455
(800) 637-7652
Internet: msmds@uxa.ecn.bgu.edu

Also available is a partial listing of products specifically related to the integration of vocational and academic education. Products in this catalog include the following:

Academic-Career Integration in Magnet High Schools: Assessing the Level of Implementation
B. Tokarska, Y.-P. Si, R. Thaler, R. L. Crain
This report examines the degree to which one city has been able to create programs with a dual emphasis on college preparation and career education, which we call "academic career magnets," and the degree to which the students have responded to the opportunity to attend such schools. The city, New York, is in many ways an ideal site for a test of the feasibility of these types of programs. The city has a long history of creating magnet programs, and has several hundred separate high school programs.
MDS-415 December 1992 $5.00

Achieving Integration Through Curriculum Development: Videotape of 11/24/92 Teleconference
The purpose of this teleconference was to share methods of achieving integration of vocational and academic education through curriculum development. Over 1,200 sites from fifty states and the District of Columbia, the Virgin Islands, Bermuda, and Canada registered to downlink the teleconference, which focused on the following questions: What is the occupational cluster approach to integration? How can applied courses be used to integrate? What is the Senior Project?
MDS-466 Videotape $15.00
Assessing the Integration of Academic and Vocational Education

Annotated Resource List: Integration of Academic and Vocational Education
TASPP

In light of the multiple objectives in the 1990 Perkins Amendments, there is a growing need for resources for practitioners seeking to integrate vocational and academic education. This annotated resource list was designed to provide practitioners with essential information.
MDS-442 Technical Assistance Report $1.50

Assessing the Integration of Academic and Vocational Education: Methods and Questions
W. N. Grubb, C. Stasz

This outlines the issues involved in “assessing academic and employment outcomes of vocational education” as required by the 1990 Amendments to the Perkins Act. It also develops a series of questions that could be addressed to state and local education officials to assess the effects of the Perkins Amendments on both state policies and local practices. This paper was originally prepared for the National Assessment of Vocational Education (NAVE), U.S. Department of Education.
MDS-445 Working Paper $4.00

Career Magnets: Interviews with Students and Staff
A. L. Heebner, R. L. Crain, D. R. Kiefer, Y.-P. Si, W. J. Jordan, B. Tokarska

This document reports on a large ethnographic study of students and staff in career magnet schools. The study concludes that the magnet schools made many students feel more hopeful about their future career opportunities. Contrary to conventional wisdom, preparing students for employment after high school did not deter them from pursuing college. In fact, knowing that they had skills which could pay their tuition or provide them with a fallback career seemed to make it easier for them to take the risk of aspiring to college. Many students also benefited by leaving their home neighborhood for a magnet school. This document is a companion piece to The Effectiveness of New York City’s Career Magnet Schools: An Evaluation of Ninth Grade Performance Using an Experimental Design (MDS-173).
MDS-386 August 1992 $6.50

The Challenge to Change
W. N. Grubb

This article, reprinted from the February 1991 issue of the Vocational Education Journal, describes three successful approaches to integrating vocational and academic education. The programs that were examined included occupational clusters and career paths; the academy model; and integrating vocational and academic coursework.
MDS-323 Reprint Series $1.00

Collaborative Efforts Between Vocational and Academic Teachers: Strategies that Facilitate and Hinder the Efforts
B. J. Schmidt

This study report, outcomes of structured interviews completed at three SREB-Vocational Education Consortium (VEC) pilot sites to determine strategies that facilitate and hinder, high school vocational and academic teachers in working together. From thirty interviews, the statements were synthesized to 57 positive and 41 negative strategies distributed among four categories: (1) instructional strategies, (2) curricular strategies, (3) collaborative efforts, and (4) administrative practices and procedures. The strategies can serve as a starting point for others contemplating changes in curriculum and instruction to achieve the integration of vocational and academic education. The study provides insight at the “grass roots,” school-site level as to what will and will not work when teachers collaborate.
MDS-164 October 1992 $2.75

“The Cunning Hand, the Cultured Mind”: Models for Integrating Vocational and Academic Education
W. N. Grubb, G. Davis, J. Lum, J. Plihal, C. Morgaine

Many approaches to integrating vocational and academic education exist. There is no single model that could apply to all schools. This document identifies and examines eight integration models, each with several variations. These models include incorporating more academic content in vocational courses; combining vocational and academic teachers to incorporate academic content into vocational programs; making academic courses more vocationally relevant; curricular alignment; modifying both vocational and academic education; the senior project as a form of integration; the academy model; occupational high schools and magnet schools; and occupational clusters, career paths, and majors.
MDS-141 July 1991 $7.50

The Effectiveness of New York City’s Career Magnet Schools: An Evaluation of Ninth Grade Performance Using an Experimental Design
R. L. Crain, A. L. Heebner, Y.-P. Si, W. J. Jordan, D. R. Kiefer

Over eighty percent of New York City’s eighth graders apply to a magnet school and three-quarters of them are accepted. Because the lottery system creates exactly the same statistical results as a classical randomized experiment, the authors state with near certainty that students with average reading ability and grades too low to be normally admitted to a magnet school get a better education if they “win the lottery.” With only ninth-grade results so far, students’ reading scores and number of courses passed have gone up, and the number of students dropping out at the transition from middle school to high school has gone down.
MDS-173 April 1992 $6.00
Helping Teachers to Understand Their Roles in Integrating Vocational and Academic Education: A Practitioner's Guide
B. J. Schmidt, C. R. Finch, S. L. Faulkner
This guide is based on descriptions of vocational and academic teacher involvement across the integration process. The purpose is to help the educational practitioner understand more fully how teachers fulfill the roles required of them in the integration process. To do this, teachers' roles are viewed from these four major integration themes: (1) Faculty Cooperation, (2) Curriculum Development, (3) Instructional Strategies, and (4) Administrative Practices and Procedures. For each of the themes, a number of subthemes address specific ways to help teachers understand their roles in integration. The themes and subthemes evolved from interviews completed at ten school sites in different states that have exemplary integration efforts underway.

Integrating Academic and Vocational Education: Guidelines for Assessing a Fuzzy Reform
C. Stasz, W. N. Grubb
The 1990 Amendments to the Perkins Act require the National Assessment of Vocational Education (NAVE) to evaluate "the extent and success of integration of academic and vocational education." This paper has the following three goals: (1) to examine principal integration and research issues; (2) to identify data on integration and suggest gaps NAVE might fill; and (3) to address problems that NAVE's evaluation might encounter.

Two Worlds: Vocational and Academic Teachers in Comprehensive High Schools
J. W. Little
Vocational and academic teachers occupy two separate worlds in comprehensive high schools. Vocational teachers have remained nearly invisible in the mainstream literature on high schools, despite the considerable attention devoted to the problems and prospects of a vocational curriculum. This paper attends to the place that vocational teachers occupy in the professional community of the high school.
NATIONAL ROSTER OF LOCAL PRACTICES in INTEGRATION
APPLICATION FORM

Please complete this form so that the list of nationwide examples of integration will represent the full range of practices in the field. This is a two-sided form.

SCHOOL

CONTACT PERSON

ADDRESS

PHONE NUMBER: ( )

CHECK PRACTICE YOU HAVE IMPLEMENTED:
(If you have implemented more than one, rank them in order of importance—"1" is most important.)

___ Academic competency—A comprehensive system of infusing academic context in vocational courses by vocational education instructors thereby providing students with improved academic performance and vocational competencies.

___ Teacher collaboration—Academic teachers collaborate with vocational teachers to integrate academic competencies into vocational courses to enhance academic success of students.

___ Vocational relevance—The academic curriculum has been extensively modified to improve student performance through the use of vocational (applied) learning experiences.

___ Curriculum alignment—The vocational and academic curriculums have been modified and coordinated across courses and/or over time to create bridges between both curricula.

___ Senior projects—A comprehensive program to provide seniors with a vocational project as a capstone to their secondary education.

___ Academy Model—A dynamic “school within a school” program provides each participating student with a common core of courses combined with vocational curriculum which is tied directly to business, labor, and industry.

___ Occupational high schools and magnet schools—The school has a vocational focus which has been combined with curriculum alignment and vocational/academic teacher collaboration to create an integrated program.

___ Occupational Clusters, Career Paths, and Majors—The vocational and academic curriculum has been aligned to prepare students for careers in clusters of related occupations.
PLEASE DESCRIBE YOUR PRACTICE BY ANSWERING THE FOLLOWING QUESTIONS ON A SEPARATE SHEET OF PAPER (in 500 words or less):

1. What does the program look like? How is integration of vocational and academic classes addressed?
2. Who benefits from your program? Students in either vocational or academic classes only? Students in both vocational and academic classes?
3. How are (both) vocational and/or academic teachers modifying curricula?
4. What occupational academies, clusters, or paths (if any) exist? How do students select them?
5. What evidence of the success of your practice are you measuring?

REFERENCES: PLEASE PROVIDE TWO (Use personnel from agencies other than your own)

1. Name __________________________ Address __________________________
   Telephone __________________________
   Agency __________________________

2. Name __________________________ Address __________________________
   Telephone __________________________
   Agency __________________________

IF YOUR SCHOOL/PROGRAM/AGENCY IS SELECTED AS AN NCRVE INTEGRATION MODEL, STAFF FROM THE AGENCY WILL ...

- Answer telephone questions
- Accept visitations
- Visit other programs
  - Within 100 miles
  - Beyond 100 miles
- Speak at conferences
- Participate on panels
- Participate in a conference

PLEASE LIST THE NAMES, AREA OF EXPERTISE, AND TELEPHONE NUMBERS OF KEY PERSONNEL.

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* Please be specific. For example, use "Social Science" for an expert on the integration of social science with vocational education.

PLEASE RETURN FORM TO
Laurie Holland
National Center for Research in Vocational Education
2150 Shattuck Avenue, Suite 1250
Berkeley, CA 94704

THANK YOU FOR YOUR COMMITMENT TO THE FUTURE!