



LEA: Kenmare Public School
Attn: Renae Murphy
PO Box 667
Kenmare, ND 58746

Thank you for your interest in joining the Western Dakota Corps of Discovery. The Corps is a high tech learning cooperative consisting of 14 schools in western North Dakota. Enclosed you will find information designed to assist in making your decision. This packet was developed to help schools take advantage of the Request for Proposals issued by the North Dakota Department of Career and Technical Education to assist schools in becoming members of cooperatives.

The state's issuance of this RFP represents an exciting opportunity for schools to address current technology education standards in a cost effective manner.

The Cooperative represents an exciting opportunity to teach modern technical skills using the latest hardware and software. The corps also serves schools as a vehicle for keeping instructors trained to deliver courses meeting and exceeding current technology education standards. Below is a list of items contained in this packet:

- ✦ Why Join a Cooperative
- ✦ Modules in the Cooperative
- ✦ Students in Action
- ✦ Graduate Courses Offered
- ✦ Rotation Schedule- Sample
- ✦ Member Schools

Schools joining the Corps are entitled to all of the equipment and services described in this packet, are asked to provide one member to the Consortium's Management Team, and will have opportunities to send an instructor(s) to the input sessions designed to direct the selection and rotation of equipment. Input and direction of administrators and teachers is crucial to the evolution and direction of the Consortium.

Again, thank you for your interest. If you have any questions or require more information, please feel free to contact the Western Dakota Corps of Discovery LEA (list above) or the cooperative service provider; Jayme Renner at 663-2968.

Sincerely,
The Western Dakota Corps of Discovery



LEA: Kenmare Public School
Attn: Renae Murphy
PO Box 667
Kenmare, ND 58746

Why Join a High-Tech Cooperative

- ✦ **The most obvious advantage is cost.** To put even a limited amount of equipment, in all four content areas, into any individual school would cost between \$100,000 and \$130,000. It is crucial to teaching the universal foundations of technology to address all four of these areas. (Industrial/Mechanical, Automated Manufacturing, Information/Communications, and Bio-Chemistry/Science) Not only does participation in a cooperative allow a school to afford to deliver in all of the crucial areas, it allows schools to provide a greater number of learning stations in each of these areas.
- ✦ The equipment is only one part of a successful technology education delivery system. **Training the instructors to use the equipment to its greatest potential, and in a safe manner, is just as important as the selection of the equipment.** Improper use of many of today's sophisticated machines can be dangerous and very costly. Effective training, in a convenient geographic location, can be hard to find. It is costly to send one or two instructors to an out-of-state factory or distributor. When multiple schools utilize the same hardware and curriculum, training cost can be greatly reduced. Local training for a greater number of instructors is always less expensive.
- ✦ The third part of a successful technology education delivery system is tech support. The Corps, for example, replaced 5 Roland ColorCamm print heads in one year. This is a \$1000.00 repair which would normally be made in California. The coop made these repairs in North Dakota for about 450.00 per head. Today's machines are expensive to repair. **The cooperative budgets for tech support so this is not an additional expense to the school.**
- ✦ **Schools in cooperatives also have the advantage of not having to pay to upgrade software** every 12 to 18 months. The cooperative keeps the software current so the school will not have to research or pay for the upgrades.
- ✦ Instructors in cooperatives have the advantage of a **common knowledge base from which to draw support and ideas.** With all of the instructors in a cooperative using the same hardware and curriculum, they can share ideas, trouble shooting skills and teaching strategies.
- ✦ **Schools participating in cooperatives need only to house the module they are currently teaching.** Space is an issue in many schools, and not having to make room to store all of the equipment required to teach all four content areas is convenient for many coop instructors.
- ✦ Cooperatives also have the ability to build an **inventory of spare equipment to eliminate down time.** If a robot owned by a school breaks, class is interrupted until the robot can be repaired. Schools in a coop can access a spare robot to use while the damaged one is repaired. This cuts down on down time and keeps classes moving forward.
- ✦ **Some of the modules available to schools in cooperatives are only available through a coop.** The Bio-Chem module used by the Corps requires a once a year purchase of supplies from England. This special relationship with the supplier makes it impossible for an individual school to offer this module.

Learning Modules in the Western Dakota Corps of Discovery



Graphic Production

This module is designed to take students from manipulating graphics to production of a final product. This module contains (2) BN-20 vinyl cutter/printers and (2) VersaLaser laser engravers. Also included are 6 computers containing Corel Graphics Suite and the appropriate drivers and interface softwares. The module comes complete with custom curriculum and contact information for ordering supplies and materials. This module is ideally suited for preparing students for the rapidly increasing demand for workers in the graphics and production career area.



Mechanical/Pneumatic/Hydraulic

This module is intended to teach the core concepts of mechanical/industrial technology. It contains 5 trainers in each section. The trainers include all parts necessary to learn the basic principles of mechanics, pneumatics and hydraulics. Also included are 10 student manuals for each section and 1 instructor manual for each section. Exposure to core industrial technology skills sets the foundation necessary to study today's more sophisticated technologies.



Laser/Fiber Optic

In this module, students learn the properties of laser light and its uses with fiber optic cable. This module contains 6 lasers, 6 receivers, and all the lenses, fiber, and mirrors to perform the experiments in the custom created curriculum. This module gives students a chance to learn how lasers and fiber optics are used to move the massive amounts of data carried by a rapidly developing global telecommunications system.



Electricity/Electronics

This module covers the basics of AC and DC electricity. Contained in this module are; 6 analog trainers, 6 multimeters, 2 oscilloscopes, and all components and wiring to complete all the experiments in the training manual. The control and operation of independent machines and complete technological systems is governed by basic electronic concepts. This module gives students an opportunity to study these concepts in a hands on learning environment.



Bio-Chemistry

This module has been designed especially for cooperative schools. The student is led through experiments in DNA extraction and plant growth cycle. The custom learning manual also contains exams to test the student's progress. Included in this module are all the equipment and perishable supplies required to extract and analyze DNA and to observe the plant life cycle. No refrigeration is required and all materials are non-hazardous when properly used and stored. This module uses rapid cycling Wisconsin Fast Plants developed at the University of Wisconsin and freeze dried DNA and enzymes from the National Center for Biotechnology Education at the University of Reading in Reading, England.



C/N/C

This module is intended to teach computer numeric control and machining concepts. Students experience the design, programming and production of a finished part. A CNC router and mill are used to produce the finished products using a variety of materials including machinable wax, acrylic and wood. Mastercam is the software are used to draft and design parts. This module also contains 6 computers with Mastercam, Mastercam Art and machine tool interface software. Custom manuals with lessons on Mastercam, Mastercam Art and machine coding is also included. This module uses industry standard CAD (computer aided drafting) and CAM (computer aided manufacturing) software to teach students how CNC (computer numeric control) is used to drive today's automated manufacturing systems.



Robotics

In this module, students are exposed to the basics of robotic control and programming. The module uses teach pendant control to teach the students to use switches, program the robots and create works cells with peripherals such as carousels, conveyors and linear slides. Included in this module are 7 robots, 7 teach pendants, 10 microswitchs with connectors, (2) carousels and (2) conveyors. The module gives students an opportunity to actually program the robots using the same linear logic used to control the equipment in today's automated factories.



GPS

The GPS module contains 15 Garmin GPS units, protective cases and extension antennas. All of the curriculum and software for a complete study of GPS function and operation is included. The curriculum also introduces GIS database with hands-on activities which incorporate GPS data with GIS databases integrating the State recommended GIS software.



Commercial Embroidery

The Commercial Embroidery module is intended to continue CNC principals based on the Universal Coordinate System and the plotting of points in the form of stitches. The embroidery machine (2) included in the module is a 15-needle industrial grade machine. It also includes computers with embroidery digitizing and editing software and auto-digitizing software. Students are exposed to cost and time of manufacturing using stitch calculating software. This module truly prepares students for real-life commercial application.



C/N/C Plasma Cutter

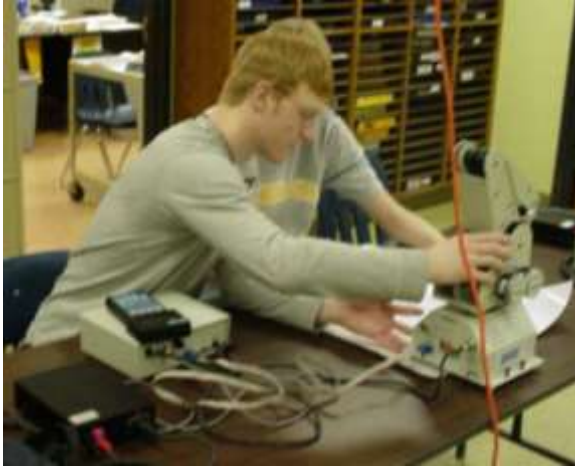
The C/N/C Plasma Cutter module is intended to expand the CNC curriculum to include high speed plasma cutting as it is done in industry. Students has the opportunity to design using the same software that is used in the CNC module and also import pre-designed parts and cut them out on metal. The module also encourages the students to use welding skills they previously learned in the classroom. This module also contains 6 computers with Mastercam, CorelDraw and machine tool interface software. A custom manual with lesson in Mastercam and the machine interface is also included. This module uses industry standard CAD (computer aided drafting) and CAM (computer aided manufacturing) software to teach students how CNC (computer numeric control) is used to drive today's automated manufacturing systems.



3D Printer

The 3D Printer module contains a UPrint SE Plus 3D printer, 6 computers (or laptops) with Solidworks software for designing in 3 dimensions. This module is intended to introduce students to the process of 3D printing and the art of creating objects in 3 dimensional objects. The UPrint SE Plus is an industry standard 3D printer used not only in university settings but also business and manufacturing. Students can use the included software (an industry leader in design) or any other software to create files and print those files on the 3D printer.

Students in Action



Students work with CNC robots.



Students prepare to send a job to the CNC mill.



A teacher helps a student use the laser engraver in the Graphic Production module.



Students use the Laser/Fiber instruction manual to complete a laser experiment.



Students work with an electronics trainers to complete a lab

The Corps of Discovery Learning Modules keep students and staff engaged in learning!



LEA: Kenmare Public School
Attn: Renae Murphy
PO Box 667
Kenmare, ND 58746



These courses are offered by the Western Dakota Corps of Discovery through the University of North Dakota. Courses are especially designed to educate the participant on the use of high-tech modules offered by the Corps of Discovery. All courses have the option of being taken for graduate or undergraduate credit.

C/N/C Machining - Introduction to CNC Machining is designed introduce students to the CNC machining process. The course covers safety, machine maintenance, the process of Industrial production, part design, machine code generation and part production. The course is two days from 8:30 AM to 4:30 PM. All students will receive a course manual containing all course content and will machine several parts with a CNC router.

C/N/C Robotics - Robotics is designed to teach the standard concepts of robotics. Participants will use the Labvolt 5100 Robot to study the basic concepts if industrial robotics, study application of robotic concepts in modern manufacturing and construct a complete automation workcell. The course is two days, from 8:30 AM to 4:30 PM. Students will receive a course manual that will be used to complete all of the robotic and automation exercises.

Electronics - Basic Electronics is designed as introductory course for a study of basic electronic concepts. Students will learn basic electronic laws, learn to use a multi-meter and learn how to build and test simple electronic circuits. The course is two days from 8:30 AM to 4:30 PM. All students will receive a course manual containing all of the course content and associated lab activities.

Laser/Optics - Laser/Fiber Optics is designed to teach the basic concepts of lasers and how lasers are used in fiber optic communication. The course covers the general behavior of light, physics related to how lasers work and how lasers are used to transmit data over fiber optic cable. The course is two days, from 8:30 AM to 4:30 PM. All students will receive a course manual that covers all of the course content.

Bio-Chem - Bio-Chemistry is designed to teach students how to use the Bio-Chemistry module to conduct a study of the life cycle of plants, present the information on basic genetics and conduct gel electrophoresis of DNA. The course is two days from 8:30 AM to 4:30 PM. All students will receive a course manual containing all course content and will perform gel electrophoresis on several DNA samples.

Mechanical/Pneumatic/Hydraulic - Mechanical/Pneumatic/Hydraulic Technology is designed teach students how to use the TII MB series trainers to study mechanical and fluid power technologies. The course covers trainer familiarization, component identification, system circuit construction and physical properties of mechanics, pneumatics and hydraulics. The course is two days from 8:30 AM to 4:30 PM. All use the TII Robotics manuals that accompany each style of trainer to complete the course objectives.

Graphic Production - Graphic Production is designed to be used with a VersaLaser laser engraver and Roland BN-20 Printer/Cutter. The course covers using CorelDraw to create a design and then execute the design using the laser engraver or printer/cutter onto the appropriate materials. The course is two days, from 8:30 AM to 4:30 PM. All students will receive a course manual covering the course concepts and will create projects using both machine tools.

Commercial Embroidery - Commercial Embroidery is designed to introduce participants to commercial embroidery. Participants will learn about the tools and methods for creating commercially embroidered products. This course will include machine operation & maintenance, embroidery basics; such as materials, hooping, placement and tips, and digitizing with embroidery software. Participants will be embroidering a variety of materials and creating designs in the digitizing software. The course is two days, from 8:30 AM to 4:30 PM. All students will receive a course manual.

Advanced Digitizing - Advanced Digitizing course is designed to give participants the opportunity to explore in depth embroidery digitizing software. Participants will have the chance to create their own designs using both manual and auto-digitizing software. The course is two days, from 8:30 AM to 4:30 PM. All participants will receive tutorials for using advanced digitizing tools and will have the opportunity to create individual projects.

CNC Plasma Cutting - Introduction to CNC Plasma Cutting is designed to introduce students to the CNC Plasma cutting process. The course covers safety, machine maintenance, selecting stock, part design, machine code generation and part production. The course is two days from 8:30 AM to 4:30 PM. All students will receive a course manual containing all course content and will cut several parts from steel.

Mastercam Art - An Introduction to Mastercam Art is designed for users of Mastercam Art, machining with CNC routers. The course covers how to generate 3 dimensional surfaces with Mastercam Art and the process for machining those surfaces with a CNC router. The course is two days, from 8:30 AM to 4:30 PM. All students will receive a course manual covering the concepts below and will create and machine 3 dimensional surfaces.

Sample Rotation Schedule

Rotation Dates	Beulah	Mott	Watford City	Hazen	Trinity
August 19-20 Rotation 1	M/P/H	CNC Bio-Chem	Laser/GPS	Graphic Production Robots	Embroidery Robots Electronics
September 30 & October 1 Rotation 2	Bio-Chem Laser/GPS Electronics Embroidery	Embroidery Mini Router	Mini Engraver M/P/H	Graphic Production Mini GPS	Bio-Chem
November 12-13 Rotation 3	Electronics Bio-Chem	Graphic Production	Bio-Chem (2kits) Embroidery Mini Engraver	Electronics CNC	M/P/H
January 6-7 Rotation 4	Graphic Production	Robots	CNC	Embroidery Bio-Chem M/P/H	Laser/GPS
February 17-18 Rotation 5	CNC Laser/GPS	M/P/H Mini Router	Robots Electronics	Embroidery Bio-Chem Mini Engraver	Graphic Production
April 1-2 Rotation 6	Robots Electronics Embroidery	Laser/GPS	Graphic Production	Mini Engraver	CNC (2 mills) Embroidery

Beulah Public School
Administrator: Dale Gilje
205 5th St NW
Beulah, ND 58523
701-873-2261

Center Public Schools
Administrator: Curt Pierce
315 Lincoln Ave
Center, ND 58530
701-794-8778

Glenburn Public School
Administrator: Jerry Erdahl
102 Raymond St
Glenburn, ND 58740
701-362-7426

Hazen Public School
Administrator: Ken Miller
520 1st Ave NE
Hazen, ND 58545
701-748-2345

Kenmare Public School
Administrator: Duane Mueller– Project Director
Renea Murphy (LEA)
PO Box 667
Kenmare, ND 58746
701-385-4996

Lewis & Clark Public Schools
Administrator: Brian Nelson
401 4th Ave NE
Berthold, ND 58718
701-453-3484

McKenzie Co. Public School
Administrator: Steven Holen
Renaë Murphy (LEA)
Box 589
Watford City, ND 58854
701-444-3624

Mott Public Schools
Administrator: Elroy Burkle
305 Dakota Ave
Mott, ND 58646
701-824-2795

North Shore Public School
Administrator: Brian Nelson
PO Box 127
Makoti, ND 58756
701-726-5591

Surrey Public School
Administrator: Terry Voiles
200 2nd St SE
Surrey, ND 58785
701-838-1262

Turtle Lake Mercer Schools
Administrator: Dick Schaffan
Box 160
Turtle Lake, ND 58575
701-448-2365

Washburn Public Schools
Administrator: Brad Rinas
Box 280
Washburn, ND 58577
701-462-3221

Wilton Public School
Administrator: Barb Kady
PO Box 249
Wilton, ND 58579
701-734-6331

Global Technology, Inc.
Service Provider
James Renner
928 17th St NE
Mandan, ND 58554
701-663-2968