Standard 3b—Career Majors: Business/Information Systems

Experiential

Student Work Sample

Context

Eleventh- and twelfth-grade business and marketing education students were asked to design a promotional brochure for the high school's Career Exploration Internship Program (CEIP). The brochure was to be used to promote the internship program to parents, community organizations, businesses, and students.

CEIP

CAREER EXPLORATION INTERNSHIP PROGRAM

Michael Roman works hard on the blueprints during his internship at Synthesis Architects in Schenectady.

"The internship program gives students an opportunity to see what being in the profession is all about. It lets students see what goes on in a real business office."
John P. Sensi
Synthesis Architects

Preparing Students for the 21st Century

In preparing students for the 21st century, many schools are moving toward more workforce preparation programs to make learning more relevant and to help prepare students for the realities of today's workplace.

Performance Indicators

Students:

. . .prepare, maintain, interpret/analyze, and transmit/distribute information in a variety of formats while demonstrating the oral, nonverbal, and written communication skills essential for working in today's international service-/information-/technological-based economy

. . .exhibit interpersonal skills essential for success in the multinational business world, demonstrate basic leadership abilities/skills, and function effectively as members of a work group or team

. . .identify, organize, plan, and allocate resources (e.g., financial, materials/facilities, human, time) in demonstrating the ability to manage their lives as learners, contributing family members, globally competitive workers, and self-sufficient individuals.

Commentary

The Sample:

- shows the integration of students' computer, marketing, and communication skills
- illustrates the students' abilities in composing/producing a professional-quality promotional brochure
- demonstrates the students' leadership skills and their abilities in functioning as members of a work team
- highlights the students' abilities in planning and implementing a real-life business project according to a student-developed timeline and school-imposed financial budget
- shows the students' abilities to conduct appropriate research
- indicates the students' abilities in working with resource copy editors and printing professionals.

POSSIBLE CAREER AREAS TO EXPLORE...

- Accounting
- Architecture
- Auto Mechanics
- Bio-Medical Engineering
- Business Administration
- Child Care
- Communications
- Elementary Education
- Engineering
- Graphic Design
- Interior Design
- Journalism
- Law
- Medical Imaging
- Meteorology
- Nursing
- Pediatrics
- Physical Therapy
- Occupational Therapy
- Sports Medicine
- TV/Film
- Veterinary Medicine

"The internship program prepares students for real life experiences and allows offices the opportunity of enjoyable afternoons and much needed help."

Gretchen Bro
DeAngelus and DeAng
Attorneys at

Alexandr
and her
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Brown
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firm

BUSINESSES CAN EXPECT OUR STUDENTS TO...

- Develop a specific training plan
- Report when scheduled
- Be ready to learn
- Be responsible
- Appreciate the efforts and guidance of their mentors

"The internship program is something that I wish I could have done in high school. It offers direction and gets students out into the field, giving them a tremendous head start."

Eric Sinsabaugh
National Weather Service

Michael Jablon and mentor Eric Sinsabaugh work on forecasting the weather at the National Weather Service at the Albany County Airport.

BUSINESSES WILL BE ABLE TO...

- Participate in the school-to-work transitional process
- Collaboratively work with Mohonasen to help students develop a positive work ethic
- Contribute to the development of future employees and leaders
- Offer their expertise and knowledge to interested learners

Standard 3b—Career Majors: Health Services

Core

Context

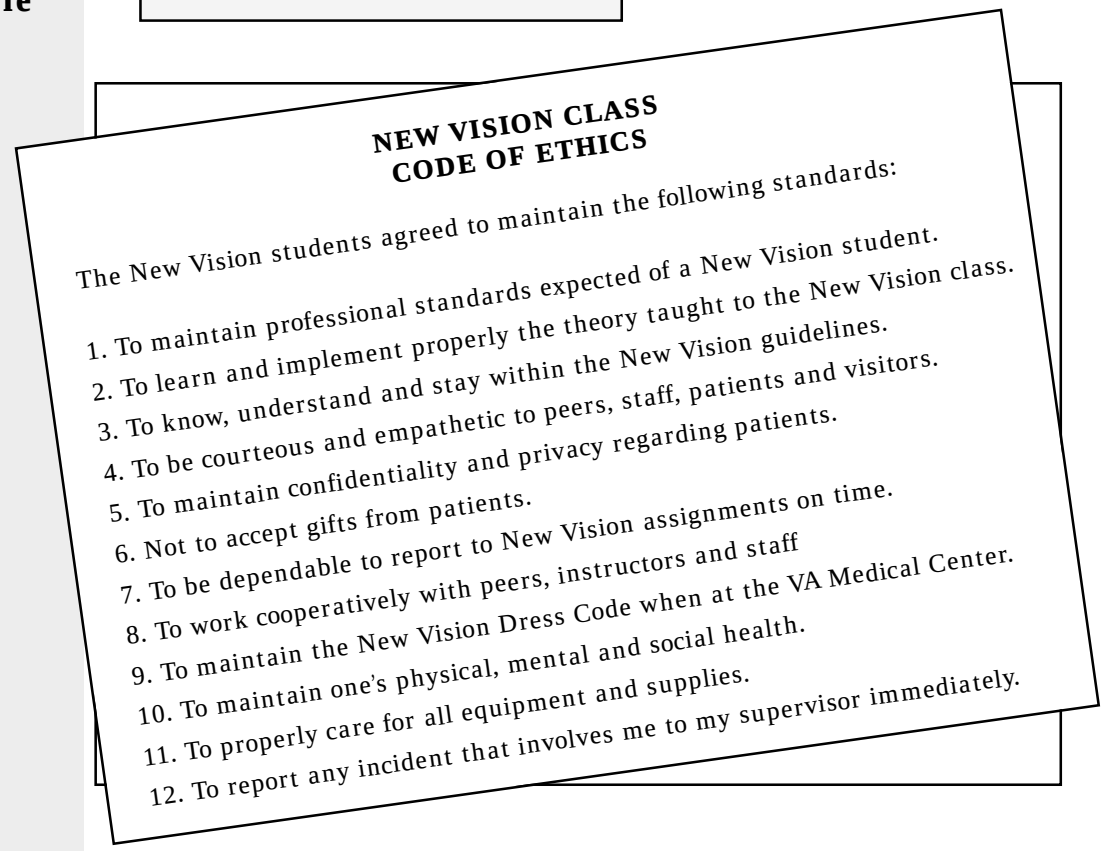
This assignment was given to seniors enrolled in an integrated health careers exploration program. After reviewing codes of ethics from various sources, the students were asked to work in cooperative learning groups to develop a code of ethics for their class.

Performance Indicators

Students:

. . .know the importance of performing their role in the health care system in accordance with laws, regulations, policies, ethics, and the rights of clients.

Student Work Sample



NEW VISION CLASS
CODE OF ETHICS

The New Vision students agreed to maintain the following standards:

1. To maintain professional standards expected of a New Vision student.
2. To learn and implement properly the theory taught to the New Vision class.
3. To know, understand and stay within the New Vision guidelines.
4. To be courteous and empathetic to peers, staff, patients and visitors.
5. To maintain confidentiality and privacy regarding patients.
6. Not to accept gifts from patients.
7. To be dependable to report to New Vision assignments on time.
8. To work cooperatively with peers, instructors and staff
9. To maintain the New Vision Dress Code when at the VA Medical Center.
10. To maintain one's physical, mental and social health.
11. To properly care for all equipment and supplies.
12. To report any incident that involves me to my supervisor immediately.

Commentary

The Sample:

- shows that the students can differentiate between legal and ethical rules
- demonstrates that the students understand the importance of equitable treatment of all people
- indicates that the students can develop a code of ethics for class with application in a health care setting.

Standard 3b—Career Majors: Health Services

Core

Context

This assignment was given to a high school student enrolled in a health exploration program. The student was asked to write an essay describing the importance of understanding science concepts in the health care environment.

Performance Indicators

Students:

. . .apply knowledge/skills acquired in academic subjects to the health care environment.

Student Work Sample

USING SCIENCE CONCEPTS IN HEALTH CAREERS

To achieve a degree in a health-related field one must have knowledge of and experience in science. Whether it be biology, chemistry, physics or anatomy and physiology, science is a crucial part of the variety of health careers.

Biology is the study of life; the environment and the organisms within it. Understanding biology is important for understanding the basic principles of health. For instance, the microbiologist studies cells and their disorders. By understanding the building blocks of the human body, microbiologists can understand its malfunctions and obtain methods to correct them. The laboratory technician uses biology to help diagnose disease by means of identifying the pathogenic microorganisms from the environment that cause disease.

Another important science field for most health professionals to understand and utilize is chemistry. The aspect of chemistry known as organic chemistry deals with the make-up of natural compounds. It is important for the dietitians to know and understand these compounds so they are able to prescribe the best food and supplements for their patients' specific needs. Pharmacists particularly need to understand chemistry thoroughly. Since the body's functions are controlled by a series of chemical reactions chemistry is used by the pharmacists to help correct imbalances in the body. By using drugs to alter the body's chemistry the pharmacists are able to correct and control the body functions.

Physics is also important when dealing with health. Physics is the study of the world around us. Physics deals with the study of waves, electricity, and energy. These aspects of science are especially important to the Cardiologists and electrocardiogram technicians. The heartbeat is a series of electrical impulses. It is important for medical personnel to understand electricity so they can comprehend how the heart works and how to diagnose its disorders. EKG technicians study these impulses by studying the waves that these impulses make on the electrocardiogram. Nurses apply the theory of physics as they move patients. They need to know the methods that work with gravity so they do not hurt themselves or their patients.

Perhaps the most important aspect of science in the health field is anatomy and physiology. This science deals with the structures of the human body and how these structures work together to maintain body homeostasis. Since all health professions deal with keeping the human body healthy, it is crucial to understand body structure and function. Some professions particularly dealing with A&P are orthopedic doctors, muscle specialists, general physicians, pharmacists and nurses.

The study of sciences is an important part of all healthrelated fields. Biology, chemistry, physics, and anatomy and physiology are important to study and comprehend as they play a crucial role in understanding the human body and keeping it healthy.

Commentary

The Sample:

- shows the student understands that knowledge acquired in science classes is important for the world of work
- identifies areas of science that are pertinent to health careers
- shows that the student can present a coherent and informative essay on an issue related to a career major area.

Standard 3b—Career Majors: Health Services

Experiential

Student Work Sample

Context

In this activity, high school students in a dental assisting program were asked to design a presentation to be given to preschool and elementary grade students to help them understand proper dental care and cavity prevention methods.

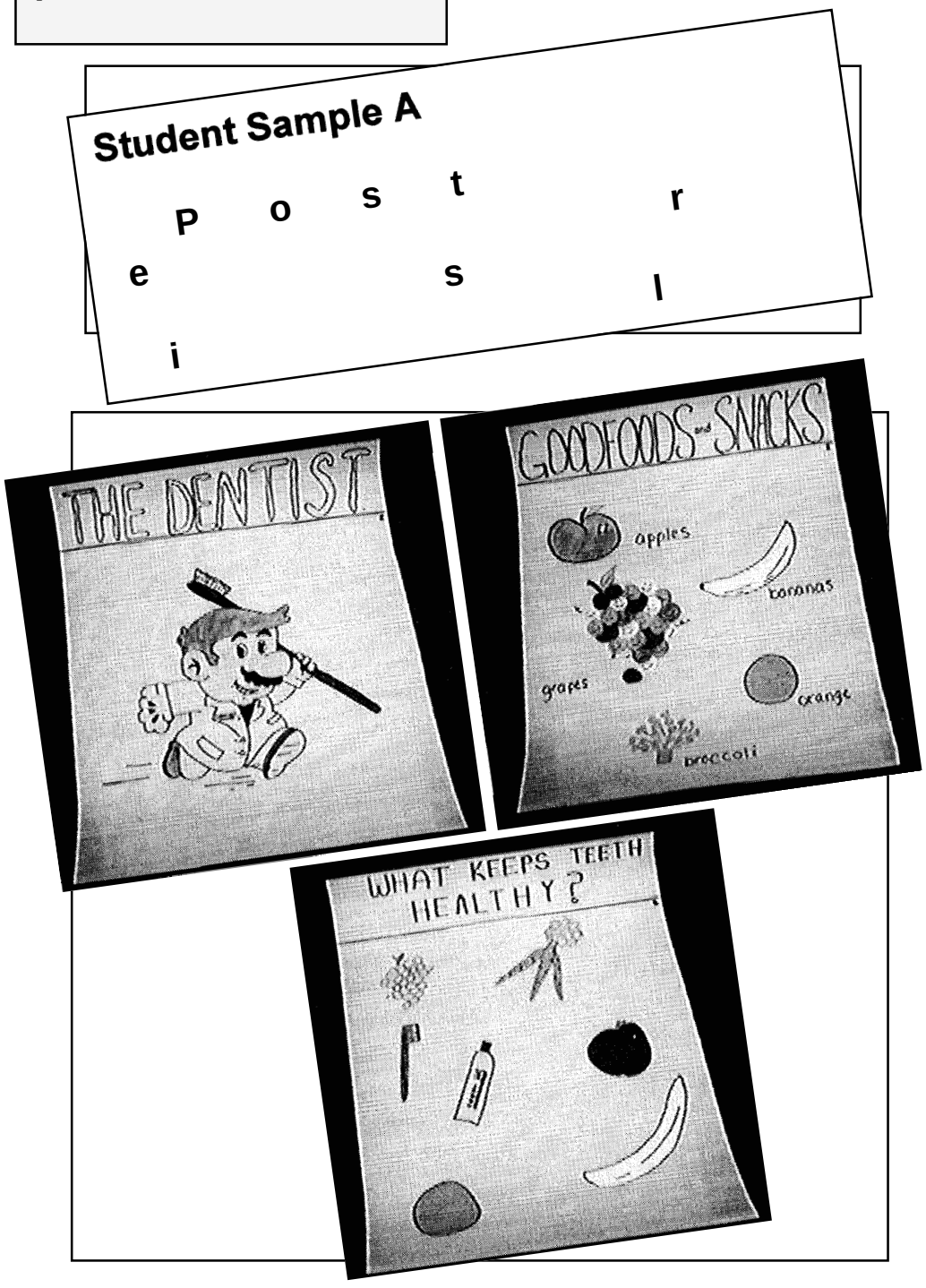
Performance Indicators

Students:

. . . develop knowledge of the concept of optimal health and identify factors that affect health maintenance

. . .communicate information in a variety of formats and media.

Student Sample A



Student Sample B

Commentary

The Sample:

- illustrates that students can design and organize a presentation to instruct preschool and elementary students about preventive health practices such as proper dental care
- indicates that students can synthesize and adapt material to suit the audience
- shows that students can inform others of the importance of a dentist and dental assistant in the health care system.

Standard 3b—Career Majors: Engineering/Technologies

Experiential

Student Work Sample

Context

Aviation students had to develop flight plans, research the weather via the Internet from Purdue University and the Duat Weather Service. The students performed weight and balance calculations and plotted weather maps, using paper and pencil. They performed manual navigation methods and basic flight planning procedures, using a navigation plotter and circular slide rule known as an E-GB.

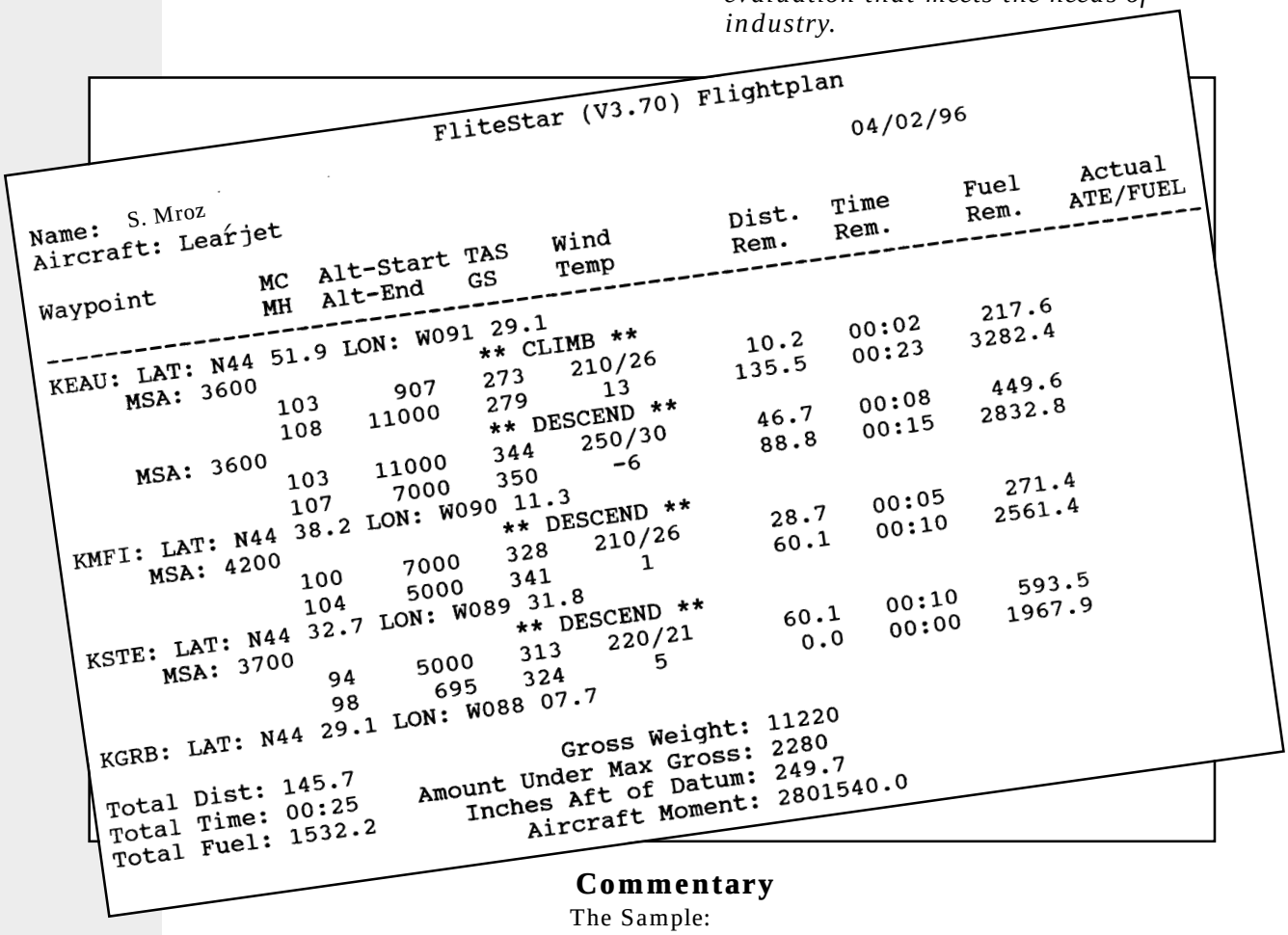
Performance Indicators

Students:

. . .develop practical understanding of engineering technology through reading, writing, sample problem solving, and employment experiences

. . .demonstrate how all types of engineering/technical organizations, equipment (hardware/software), and well-trained human resources assist and expedite the production/distribution of goods and services

. . .demonstrate knowledge of planning, product development and utilization, and evaluation that meets the needs of industry.



FliteStar (V3.70) Flightplan

04/02/96

Name: S. Mroz
Aircraft: Learjet

Waypoint	MC / MH	Alt-Start / Alt-End	TAS / GS	Wind / Temp	Dist. Rem.	Time Rem.	Fuel Rem.	Actual ATE/FUEL
KEAU: LAT: N44 51.9 LON: W091 29.1								
MSA: 3600			** CLIMB **		10.2	00:02	217.6	
	103	907	273	210/26	135.5	00:23	3282.4	
	108	11000	279	13				
			** DESCEND **		46.7	00:08	449.6	
MSA: 3600					88.8	00:15	2832.8	
	103	11000	344	250/30				
	107	7000	350	-6				
KMFI: LAT: N44 38.2 LON: W090 11.3								
MSA: 4200			** DESCEND **		28.7	00:05	271.4	
	100	7000	328	210/26	60.1	00:10	2561.4	
	104	5000	341	1				
KSTE: LAT: N44 32.7 LON: W089 31.8								
MSA: 3700			** DESCEND **		60.1	00:10	593.5	
	94	5000	313	220/21	0.0	00:00	1967.9	
	98	695	324	5				
KGRB: LAT: N44 29.1 LON: W088 07.7								

Total Dist: 145.7
Total Time: 00:25
Total Fuel: 1532.2

Gross Weight: 11220
Amount Under Max Gross: 2280
Inches Aft of Datum: 249.7
Aircraft Moment: 2801540.0

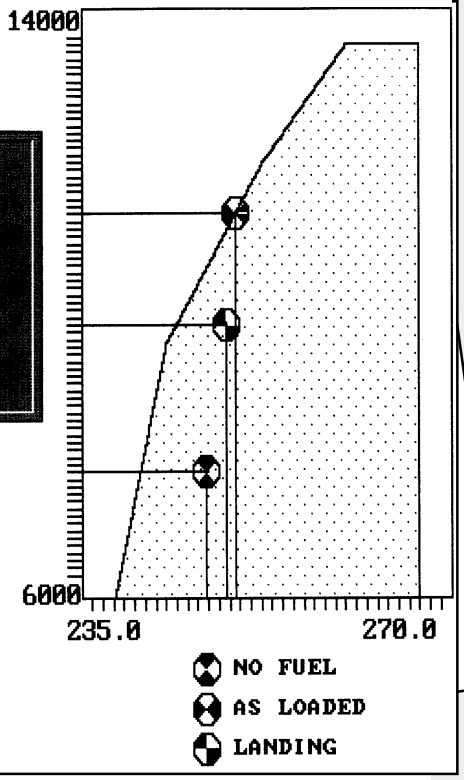
Commentary

The Sample:

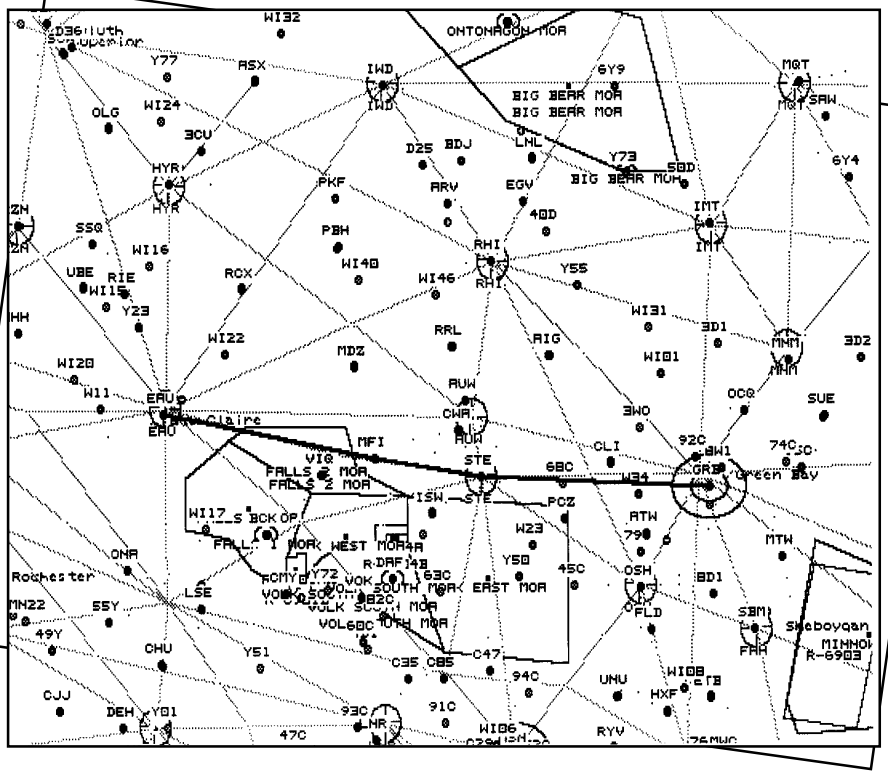
- demonstrates that students can perform weight and balance calculations relating to aircraft flight performance
- illustrates that students can develop a flight plan
- shows that students can interact with the technological equipment necessary to plot a flight plan.

Weight & Balance

Desc	Type	Weight
Empty Acft	other	6500
Pilot & Pass	other	400
Seat 2 & 3	pass	240
Seat 5 & 6	pass	350
Seat 7 & 8	pass	130
Baggage	bagg	100
Fuel	fuel	3500



Simulated Flight Route



Standard 3b—Career Majors: Engineering/Technologies

Experiential

Student Work Sample

Context

An eleventh-grade student was presented with the following situation: a business had an original, not-to-scale drawing of a hinged bracket assembly. The business also had the actual hinged bracket assembly. The business requested an accurately scaled CAD drawing of the hinged bracket assembly on a "B" sized ANSI border, 11" x 17", with associated line weighing and appropriate CAD layering principles applied.

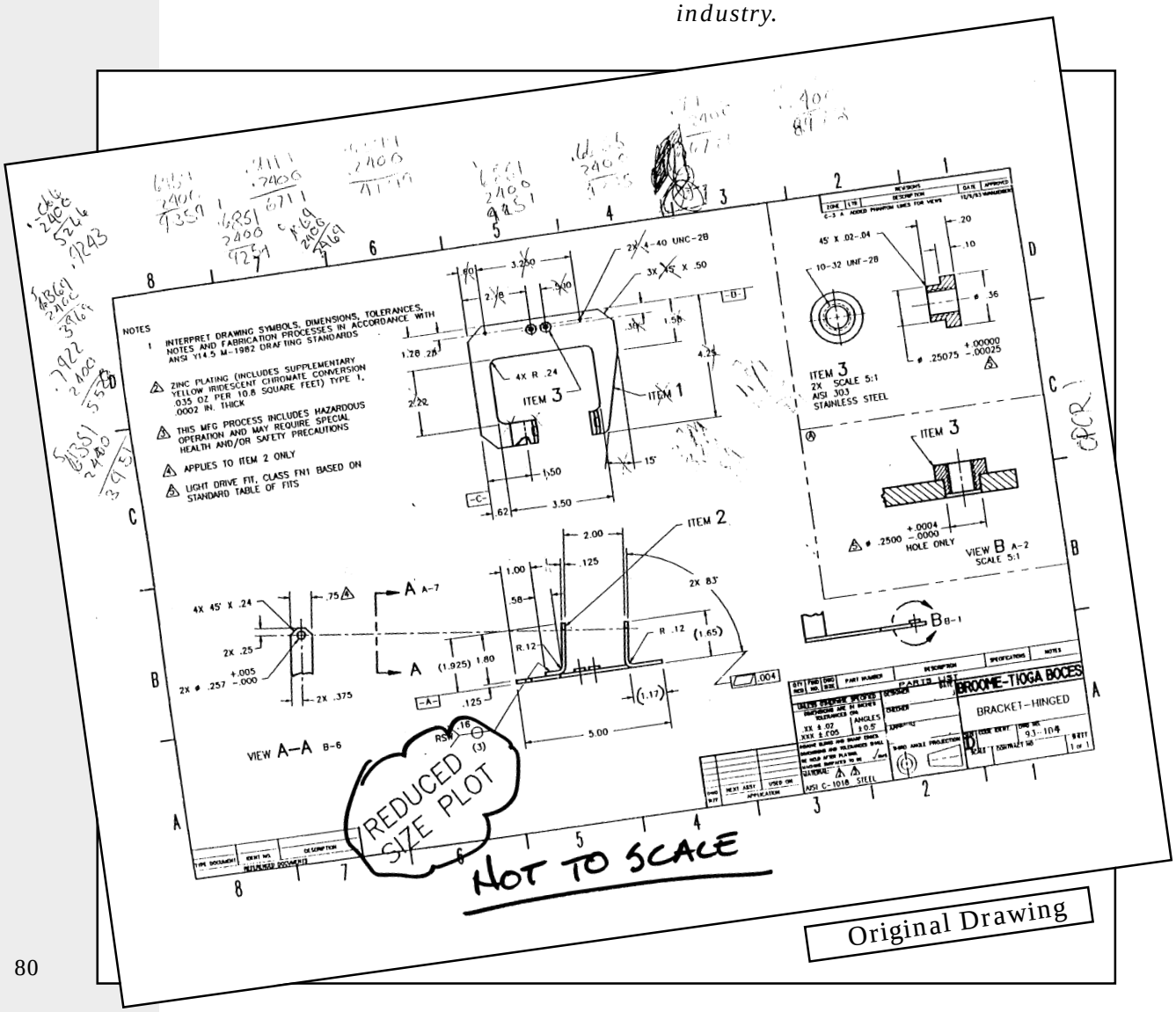
Performance Indicators

Students:

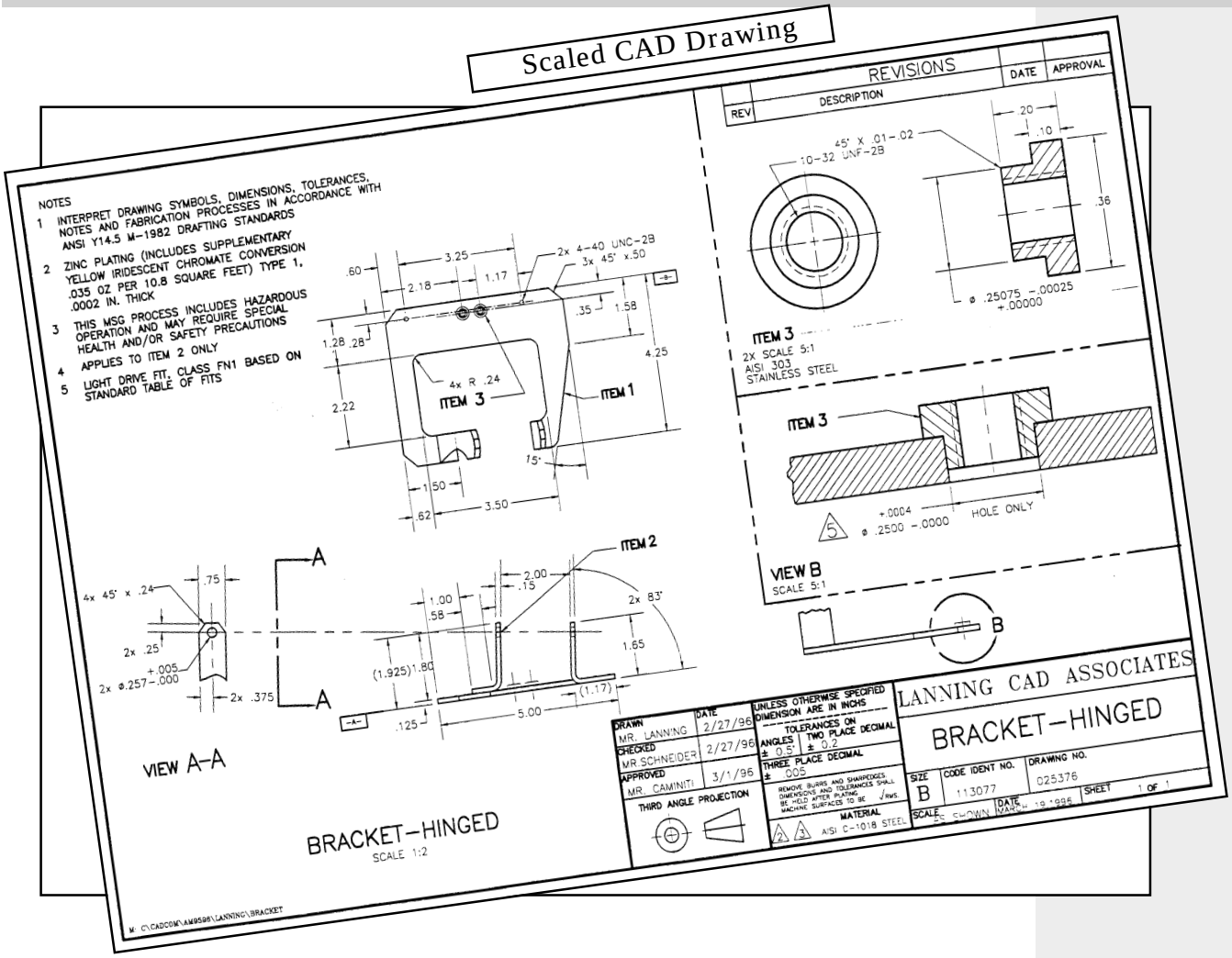
. . .develop practical understanding of engineering technology through reading, writing, sample problem solving, and employment experiences

. . .demonstrate how all types of engineering/technical organizations, equipment (hardware/software), and well-trained human resources assist and expedite the production/distribution of goods and services

. . .demonstrate knowledge of planning, product development and utilization, and evaluation that meets the needs of industry.



Scaled CAD Drawing



Commentary

The Sample:

- demonstrates the student's ability to use a computer system and related design software
- illustrates the student's skill in meeting recognized manufacturing design standards commonly used in industrial employment settings
- shows that the student can skillfully apply concepts of mathematics required in the engineering/technologies career major area.

Standard 3b—Career Majors: Engineering/Technologies

Experiential

Context

This eleventh-twelfth-grade activity reflects a technical engineering problem posed to an electronics class. The engineering challenge is designed to have students work as a team to develop a working circuit from engineering specifications. The students will assemble a regulated AC-to-DC power supply from a parts list, using a block diagram.

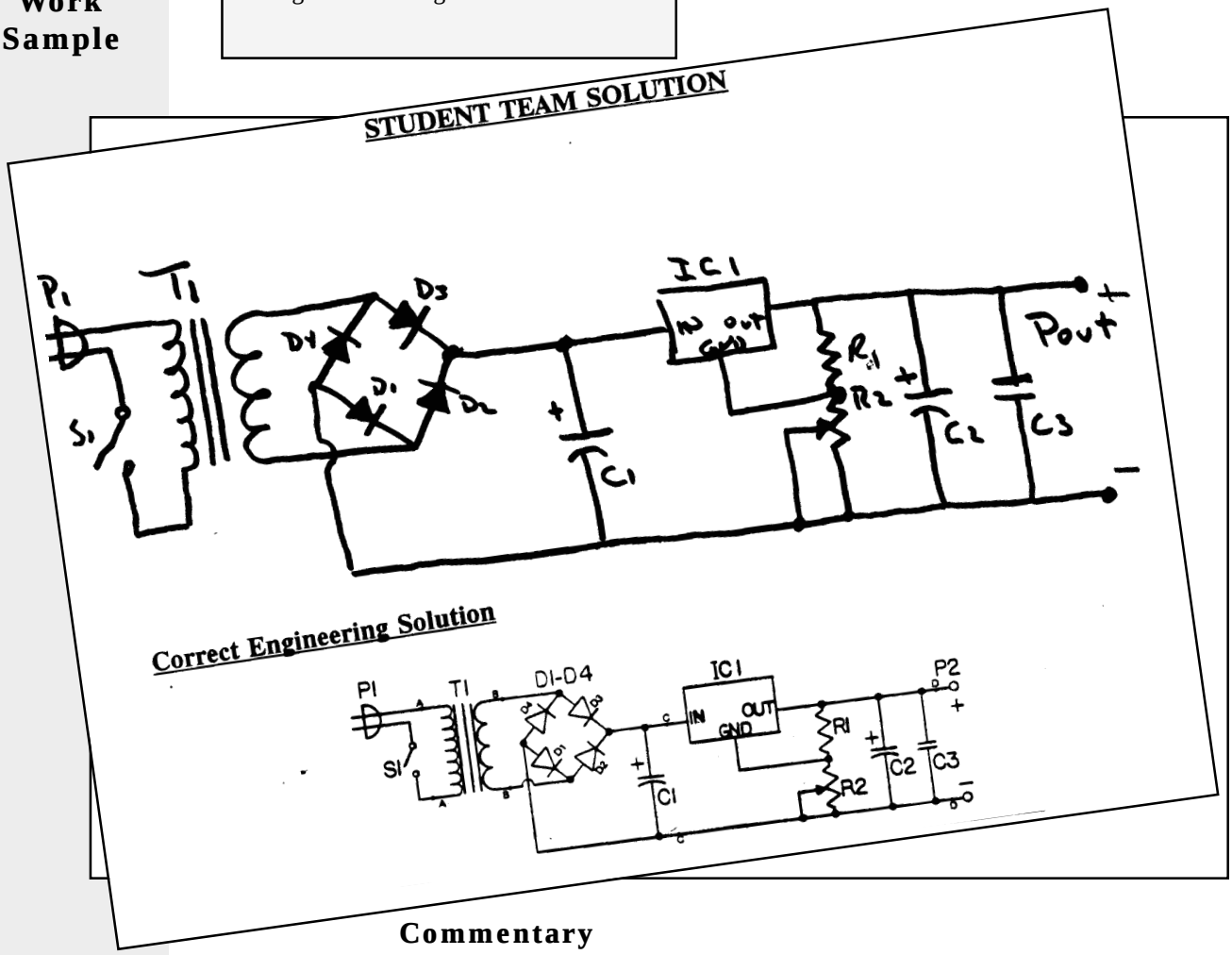
Performance Indicators

Students:

. . .develop practical understanding of engineering technology through reading, writing, sample problem solving, and employment experiences

. . .demonstrate knowledge of planning, product development and utilization, and evaluation that meets the needs of industry.

Student Work Sample



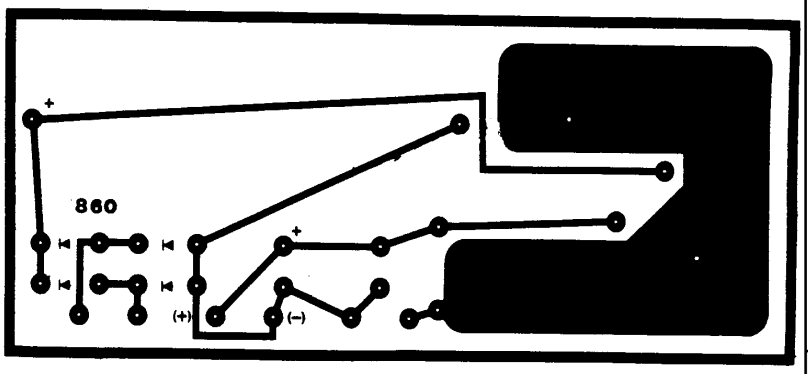
Commentary

The Sample:

- demonstrates that students are able to use materials, tools, instruments, and equipment, and follow safety procedures
- shows the students' abilities to research and design a working circuit as members of a team
- shows that students arrived at an appropriate conclusion by building a working model.

Parts List and Block Diagram

C1 - 2000 TO 3000 uF Capacitor
C2 - 100 uF Capacitor
C3 - .1 uF Capacitor
D1 - D4 - 1N4003 Diode
IC1 - LM309K Regulator
P1 - AC Line cord
R1 - 470 Ω Resistor
R2 - 5KΩ Potentiometer
S1 - SPST Slide Switch
T1 - 117V to 18 - 22V at 1A.



Standard 3b—Career Majors: Human and Public Services

Core

Student Work Sample

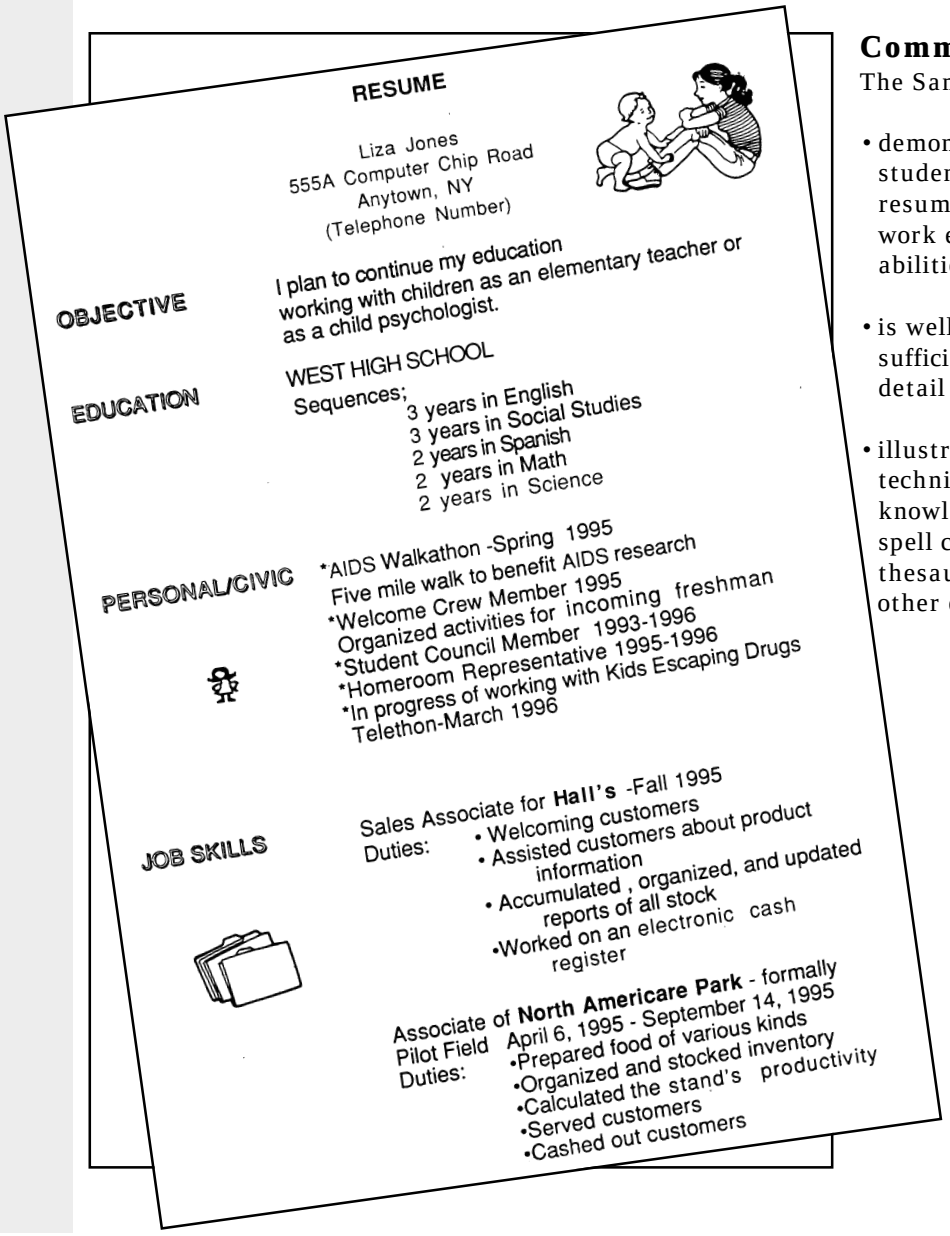
Context

A home economics student had to prepare a resume and write a report about a successful job application/ employment experience, using computer technology.

Performance Indicators

Students:

. . .demonstrate effective communication skills needed to meet the expectations of human and public service consumers.



RESUME

Liza Jones
555A Computer Chip Road
Anytown, NY
(Telephone Number)

OBJECTIVE

I plan to continue my education working with children as an elementary teacher or as a child psychologist.

EDUCATION

WEST HIGH SCHOOL
Sequences;
3 years in English
3 years in Social Studies
2 years in Spanish
2 years in Math
2 years in Science

PERSONAL/CIVIC

*AIDS Walkathon -Spring 1995
Five mile walk to benefit AIDS research
*Welcome Crew Member 1995
Organized activities for incoming freshman
*Student Council Member 1993-1996
*Homeroom Representative 1995-1996
*In progress of working with Kids Escaping Drugs
Telethon-March 1996

JOB SKILLS

Sales Associate for **Hall's** -Fall 1995
Duties:
• Welcoming customers
• Assisted customers about product information
• Accumulated , organized, and updated reports of all stock
•Worked on an electronic cash register

Associate of **North Americare Park** - formally Pilot Field April 6, 1995 - September 14, 1995
Duties:
•Prepared food of various kinds
•Organized and stocked inventory
•Calculated the stand's productivity
•Served customers
•Cashed out customers

Commentary

The Sample:

- demonstrates the student's ability to write a resume detailing current work experience, skills, abilities, and interests
- is well organized with sufficient supporting detail
- illustrates the student's technical and processing knowledge (e.g., use of spell checks, punctuation, thesaurus, format, and other editorial tools).

Student Commentary on Successful Job Application and Employment

In early December I had an open interview at Media Play. There were several positions open for Christmas help. I decided to take my resume which we had worked on in our Independent Living class.

During the interview, Mike, one of the managers, had asked me to tell him a little about myself. I immediately took out my resume, handed it to Mike and began to talk about myself. I found it very easy to talk about my accomplishments and past experience because of my resume. Mike was very impressed with the organization of my resume. He asked me questions pertaining to my experience and I felt very confident and reassured when answering him.

My resume made me feel relaxed about talking about myself. It was a guideline that I could follow and fall back on if I ran out of things to say, but I never did run out of things to say. There was always something to expand on or something Mike wanted to know more about.

Resumes are great tension releases, everything you need or want to talk about is already pre-thought and well organized. Resumes show that you are confident and well-prepared. Because of my resume I received the job. I would encourage anyone who has a job interview to make up a well prepared resume. It doesn't take very long and it could get you the chance to get your foot in the door and begin a great job. Also, your resume boosts your self-esteem, makes you realize all of your achievements and gives you an opportunity to talk about yourself and overall you feel 100% better regardless if you get the job or not, you feel better knowing all you have done.

Standard 3b—Career Majors: Human and Public Services

Specialized

Context

In this project, students in a human services course invited eighth-grade students to participate in a "shadowing day" to learn what a normal day in high school was like.

Performance Indicators

Students:

. . .demonstrate how to interact effectively and sensitively with others

. . .apply personal and resource management skills.

Student Work Sample

Family & Consumer Sciences Department
Careers in Human Services
Eighth Grade Shadowing Day - 1995
Evaluation Form

Please respond to the following questions regarding eighth grade shadowing day. Please be specific and complete.

1. What did you expect the high school to be like *before* you came to visit on shadowing day?
I wasn't sure.

2. How did you spend your shadowing day? Fill in the chart below:

Period	Escort	Class Visited
1	Lori	Typing
2	Lori	Comp. Room
3	Entire class	CHS-reception
4	Rose	S-H (tour)
5	Rose	Govem.
6 (Lunch)	Rose	French
7	Rose	Creative Express.
8	Lori	Child Phys.

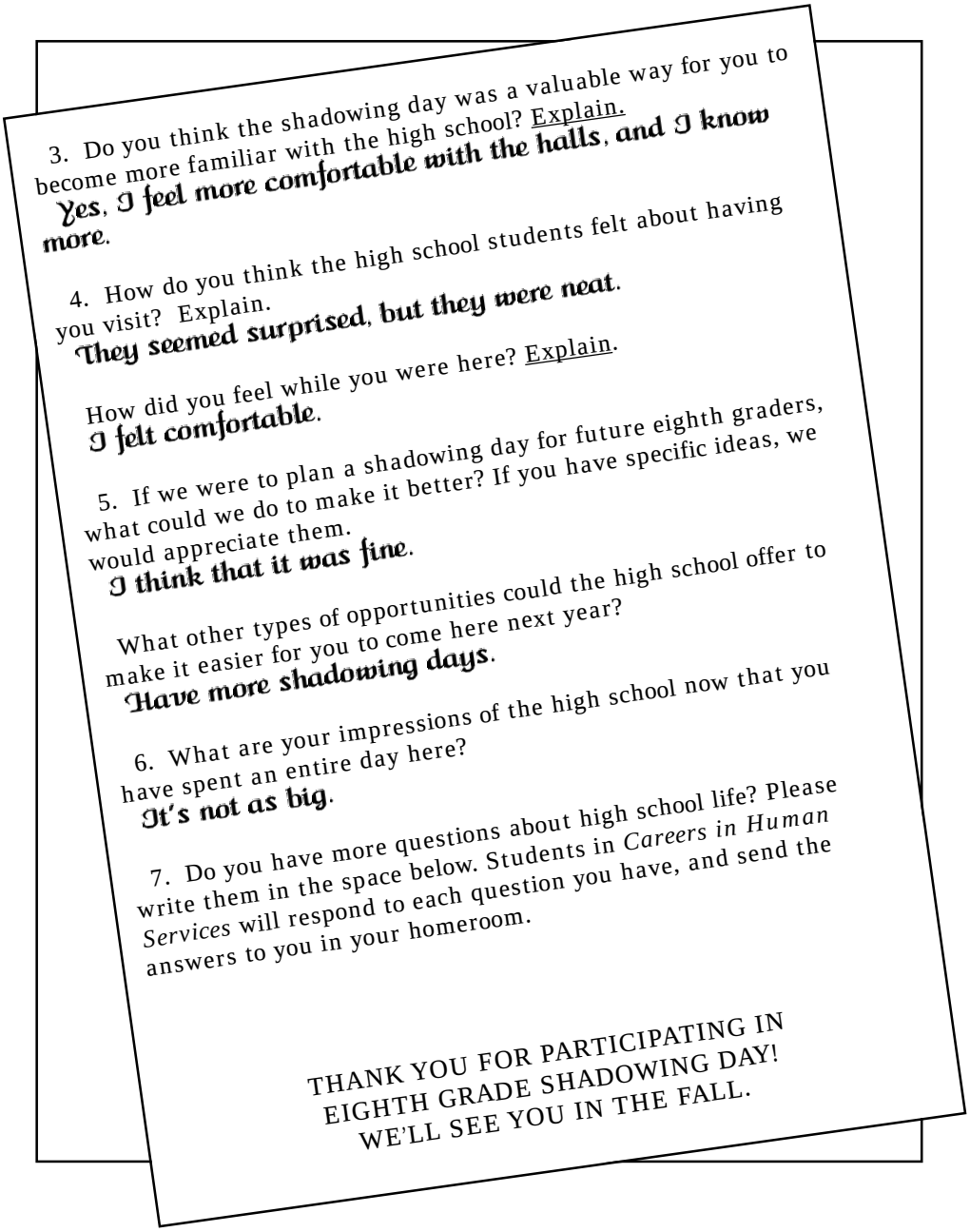
What was your favorite class of the day? Tell why it was your favorite.
My favorite class was Creative Expressions because I got to participate.

What was your least favorite time of the day? Why?
My least favorite was Computer Room, she normally had English, but it was free period. And there was nothing I could do.

Commentary

The Sample:

- demonstrates how the student worked to contribute to a positive high school environment
- shows the students' consideration for the needs of eighth graders in formulating the project
- indicates that responses will be used to set goals for future transition projects.



3. Do you think the shadowing day was a valuable way for you to become more familiar with the high school? Explain.
Yes, I feel more comfortable with the halls, and I know more.

4. How do you think the high school students felt about having you visit? Explain.
They seemed surprised, but they were neat.

How did you feel while you were here? Explain.
I felt comfortable.

5. If we were to plan a shadowing day for future eighth graders, what could we do to make it better? If you have specific ideas, we would appreciate them.
I think that it was fine.

What other types of opportunities could the high school offer to make it easier for you to come here next year?
Have more shadowing days.

6. What are your impressions of the high school now that you have spent an entire day here?
It's not as big.

7. Do you have more questions about high school life? Please write them in the space below. Students in *Careers in Human Services* will respond to each question you have, and send the answers to you in your homeroom.

THANK YOU FOR PARTICIPATING IN
EIGHTH GRADE SHADOWING DAY!
WE'LL SEE YOU IN THE FALL.

Standard 3b—Career Majors: Human and Public Services

Experiential

Student Work Sample

Context

Students in an eleventh-twelfth-grade independent living class were asked to plan a hands-on activity which involves working with growing children to produce a collaborative project. This activity, called "Stone Soup," gives high school students the opportunity to communicate with and nurture young children.

Performance Indicators

Students:

. . .demonstrate effective communication skills needed to meet the expectations of human and public services consumers

. . .understand the process of human growth and development and its influence on client needs

. . .demonstrate how to interact effectively and sensitively with others

. . .solve problems, set goals, and make decisions in order to provide services to best meet the needs of others.

I learned that teaching is not only helping students learn, but also dealing with their everyday problems. Teaching is a very strenuous job. It is interesting, fun and exciting, yet it is also very frustrating and stressful. A teacher must have motivation to help a child and a lot of dedication to his/her job.

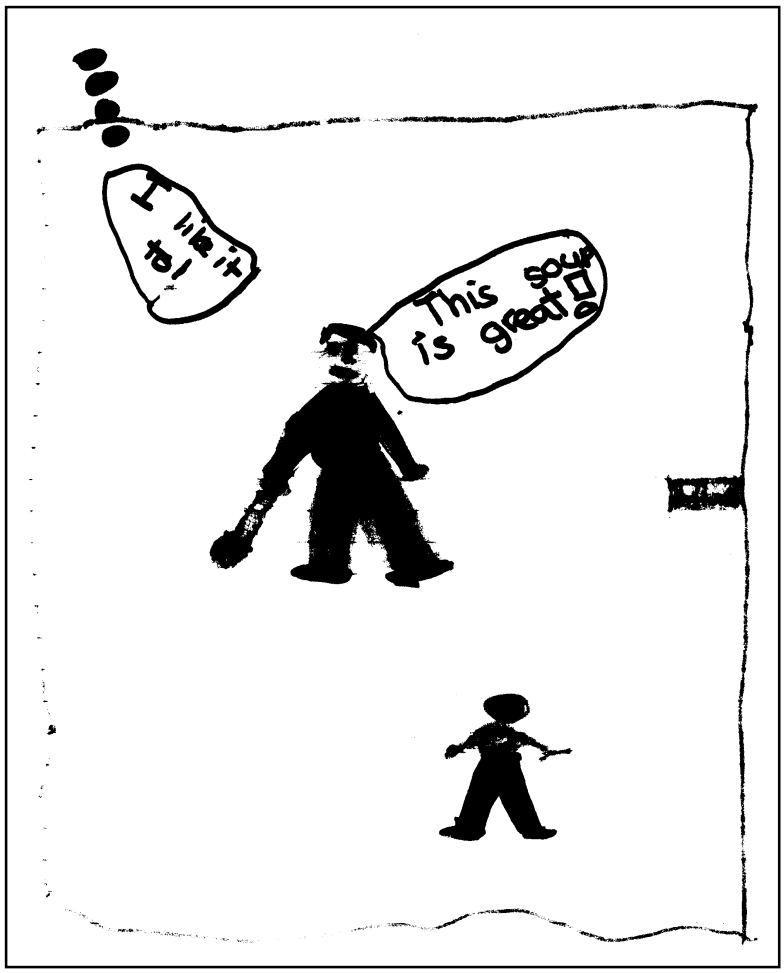
I enjoyed working with the students one on one. I especially enjoyed working with one little boy. Although he was slow in doing his work, knowing that I could help him made me and him feel good. I think the one thing I learned about myself is how attached you become to these students. I feel like they are my own kids and knowing that you can help them is the best feeling in the world.

(work done by an eleventh-grade student)

Commentary

The Sample:

- demonstrates the student's ability to identify strengths and areas for further development in relation to human service career readiness
- demonstrates effective communication skills
- shows that the student helped the younger children exhibit positive behaviors
- illustrates that the student can apply the concept of nurturing to human and public services occupations through volunteer work in a child-related facility
- indicates that contributing to a positive environment enables all groups to be productive and fulfilled.



(work done by an elementary student)

Dear Teacher,

Thank you for letting us do this project with you and your home economics class. We really enjoyed it. I hope you liked it. At first the soup didn't look good. But that was before we cooked it! After we cooked it it looked, smelled and tasted good. Everybody that ate some liked it! I ate three bowls. Tomorrow I am going to have some more. That soup is so good. I could eat a whole pot of it if I had room for it. Did you try any? I'm so glad that I got your recipe. Now I can make it home whenever I want to. I liked everything in the soup except the green beans. But the rest was great!

Standard 3b—Career Majors: Natural and

Core

Context

Eleventh-grade students in an Environmental Science class, as a lab exercise, were given a fresh sample of creek water to observe algae growth when phosphate and nitrate compounds were added. This lab activity allowed students to set up and conduct controlled experiments in order to observe and determine what changes occur in pond water as a result of the addition of phosphate and nitrate. Students were assigned to groups of five or six.

Performance Indicators

Students:

. . .demonstrate a solid base of knowledge and skills in natural and agricultural sciences

. . .prepare, maintain, interpret, and disseminate quantitative and qualitative pieces of information relating to the natural and agricultural sciences.

Student Work Sample

Name

LAB-AIDS® INC., 1977©

Date

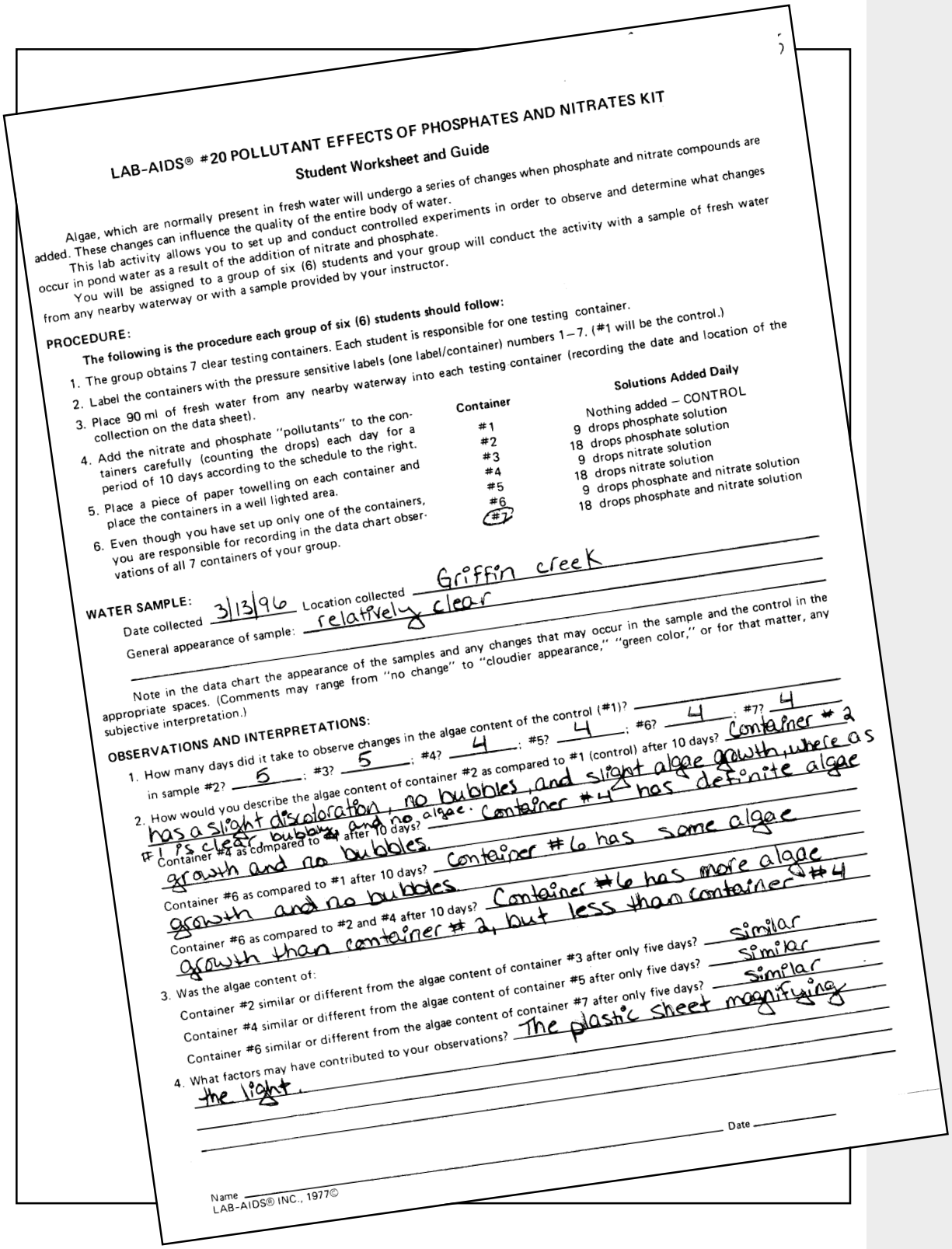
DATA CHART

DAY	CONTROL #1	#2	#3	#4	#5	#6	#7
1	nothing observed	nothing observed	nothing observed	nothing observed	nothing observed	nothing observed	nothing observed
2	more bubbles than others slight yellow/green	Bubbly/ yellow/green color slight	Bubbly/ yellow green color slight	Bubbly/ more yellow/ green color	Bubbly/ more yellow/ green color	Bubbly/ more yellow/ green color	bubbly/ slight yellow/ green color
3	has the most bubbles slightly yellow/ green	Fewer bubbles same color	Fewer bubbles Same color	Fewer bubbles same color	fewer bubbles same color	fewer bubbles Same color	fewer colors same color
4	Same as before	Same as before	Same as before	Algae present (most)	algae present (most)	Slight algae present	Slight algae present
5	Still bubbly	small amount of Slight algae yellow/green color	small amount of Slight algae yellow/green color	2nd most algae	most algae	Slight algae present	Slight algae present
6	Same as before	Same as before	Same as before	Same as before	Same as before	Same as before	Same as before
7	11	11	11	11	11	11	11
8							
9							
10							

Commentary

The Sample:

- shows that students set up an experiment and recorded daily observations
- shows that students organized, recorded, and interpreted data of algae growth
- demonstrates that students arrived at an appropriate conclusion
- shows that students were able to work together as members of a team
- demonstrates simple agricultural-related science concepts and interpreting data
- indicates that students understand how nitrates and phosphates affected algae growth.



LAB-AIDS® #20 POLLUTANT EFFECTS OF PHOSPHATES AND NITRATES KIT

Student Worksheet and Guide

Algae, which are normally present in fresh water will undergo a series of changes when phosphate and nitrate compounds are added. These changes can influence the quality of the entire body of water.

This lab activity allows you to set up and conduct controlled experiments in order to observe and determine what changes occur in pond water as a result of the addition of nitrate and phosphate.

You will be assigned to a group of six (6) students and your group will conduct the activity with a sample of fresh water from any nearby waterway or with a sample provided by your instructor.

PROCEDURE:

The following is the procedure each group of six (6) students should follow:

1. The group obtains 7 clear testing containers. Each student is responsible for one testing container.
2. Label the containers with the pressure sensitive labels (one label/container) numbers 1–7. (#1 will be the control.)
3. Place 90 ml of fresh water from any nearby waterway into each testing container (recording the date and location of the collection on the data sheet).
4. Add the nitrate and phosphate "pollutants" to the containers carefully (counting the drops) each day for a period of 10 days according to the schedule to the right.
5. Place a piece of paper towelling on each container and place the containers in a well lighted area.
6. Even though you have set up only one of the containers, you are responsible for recording in the data chart observations of all 7 containers of your group.

Container	Solutions Added Daily
#1	Nothing added – CONTROL
#2	9 drops phosphate solution
#3	18 drops phosphate solution
#4	9 drops nitrate solution
#5	18 drops nitrate solution
#6	9 drops phosphate and nitrate solution
(#7)	18 drops phosphate and nitrate solution

WATER SAMPLE:

Date collected 3/13/96 Location collected Griffin creek

General appearance of sample: relatively clear

Note in the data chart the appearance of the samples and any changes that may occur in the sample and the control in the appropriate spaces. (Comments may range from "no change" to "cloudier appearance," "green color," or for that matter, any subjective interpretation.)

OBSERVATIONS AND INTERPRETATIONS:

1. How many days did it take to observe changes in the algae content of the control (#1)? _____ in sample #2? 5; #3? 5; #4? 4; #5? 4; #6? 4; #7? 4

2. How would you describe the algae content of container #2 as compared to #1 (control) after 10 days? Container # 2 has a slight discoloration, no bubbles, and slight algae growth, where as #1 is clear bubbly and no algae. Container #4 has definite algae growth and no bubbles.

Container #6 as compared to #1 after 10 days? Container #6 has some algae growth and no bubbles.

Container #6 as compared to #2 and #4 after 10 days? Container #6 has more algae growth than container # 2, but less than container #4

3. Was the algae content of:

Container #2 similar or different from the algae content of container #3 after only five days? similar

Container #4 similar or different from the algae content of container #5 after only five days? similar

Container #6 similar or different from the algae content of container #7 after only five days? similar

4. What factors may have contributed to your observations? The plastic sheet magnifying the light.

Name _____ Date _____

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Standard 3b—Career Majors: Natural and

Specialized

Context

This ninth-grade report was prepared in response to a new high school FFA program called "Adopt-A-Classroom." The purpose of the program is to teach elementary students about various aspects of agriculture. High school FFA members come into individual classrooms each month to teach students about agricultural-related activities.

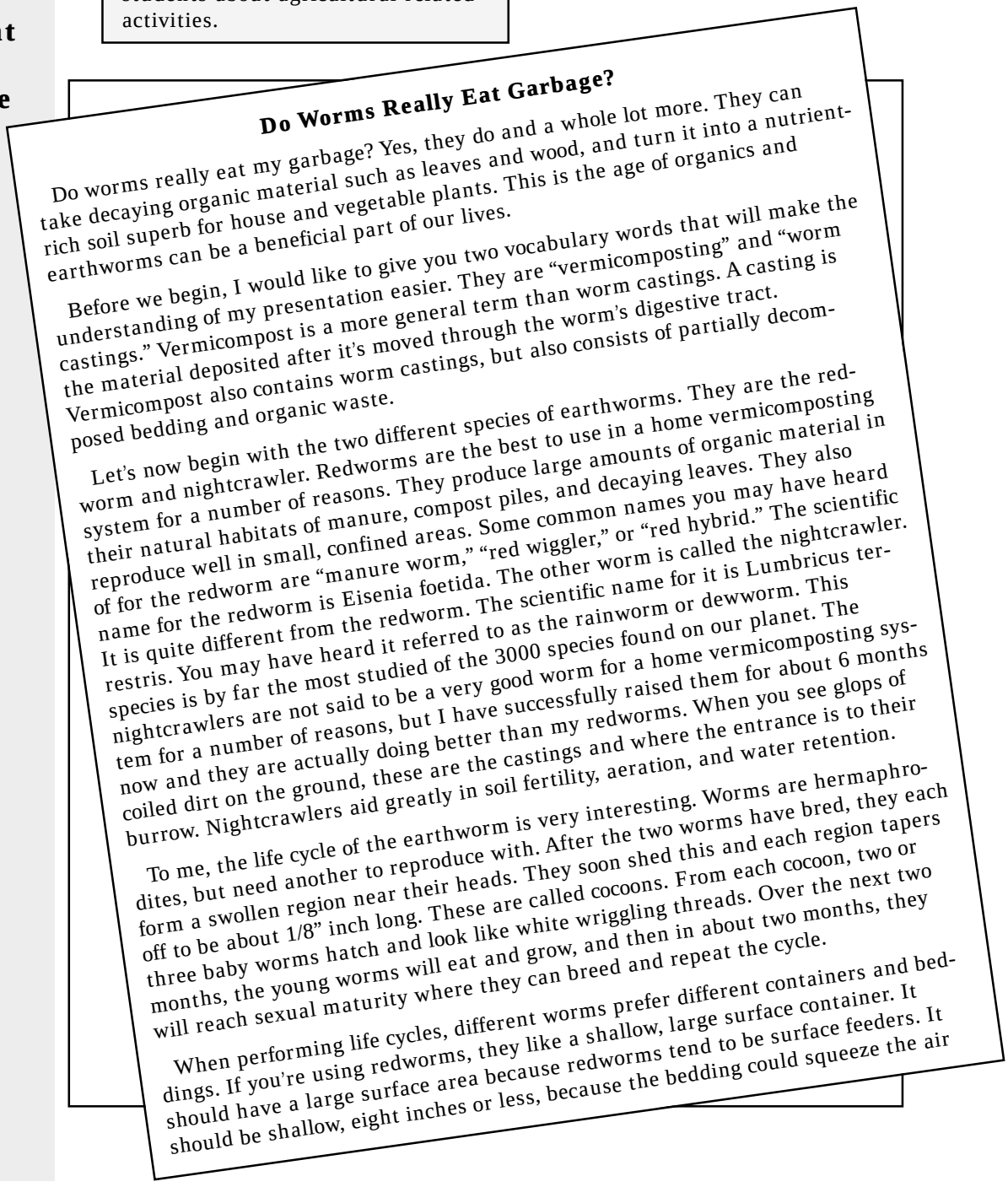
Performance Indicators

Students:

. . .demonstrate a solid base of knowledge and skills in natural and agricultural sciences

. . .prepare, maintain, interpret, and disseminate quantitative and qualitative pieces of information relating to the natural and agricultural sciences.

Student Work Sample



Do Worms Really Eat Garbage?

Do worms really eat my garbage? Yes, they do and a whole lot more. They can take decaying organic material such as leaves and wood, and turn it into a nutrient-rich soil superb for house and vegetable plants. This is the age of organics and earthworms can be a beneficial part of our lives.

Before we begin, I would like to give you two vocabulary words that will make the understanding of my presentation easier. They are "vermicomposting" and "worm castings." Vermicompost is a more general term than worm castings. A casting is the material deposited after it's moved through the worm's digestive tract. Vermicompost also contains worm castings, but also consists of partially decomposed bedding and organic waste.

Let's now begin with the two different species of earthworms. They are the redworm and nightcrawler. Redworms are the best to use in a home vermicomposting system for a number of reasons. They produce large amounts of organic material in their natural habitats of manure, compost piles, and decaying leaves. They also reproduce well in small, confined areas. Some common names you may have heard of for the redworm are "manure worm," "red wiggler," or "red hybrid." The scientific name for the redworm is Eisenia foetida. The other worm is called the nightcrawler. It is quite different from the redworm. The scientific name for it is Lumbricus terrestris. You may have heard it referred to as the rainworm or dewworm. This species is by far the most studied of the 3000 species found on our planet. The nightcrawlers are not said to be a very good worm for a home vermicomposting system for a number of reasons, but I have successfully raised them for about 6 months now and they are actually doing better than my redworms. When you see glops of coiled dirt on the ground, these are the castings and where the entrance is to their burrow. Nightcrawlers aid greatly in soil fertility, aeration, and water retention.

To me, the life cycle of the earthworm is very interesting. Worms are hermaphrodites, but need another to reproduce with. After the two worms have bred, they each form a swollen region near their heads. They soon shed this and each region tapers off to be about 1/8" inch long. These are called cocoons. From each cocoon, two or three baby worms hatch and look like white wriggling threads. Over the next two months, the young worms will eat and grow, and then in about two months, they will reach sexual maturity where they can breed and repeat the cycle.

When performing life cycles, different worms prefer different containers and beddings. If you're using redworms, they like a shallow, large surface container. It should have a large surface area because redworms tend to be surface feeders. It should be shallow, eight inches or less, because the bedding could squeeze the air

out of the bottom layers and develop an awful smelling, anaerobic condition. You need an aerobic environment where oxygen is present throughout the bedding. Oxygen is needed not only for the worms, but also for the millions of microorganisms that aid in the breaking down of food wastes.

In your container, the worms need a bedding that they can move freely through. After a while, all the bedding will be turned to worm castings. Some of the best types of beddings for redworms are shredded paper, manure, leaf mole and peat moss. I use a 50/50 blend of machine-shredded paper and peat moss. For redworms, it is not good to use soil or dirt because redworms are naturally found in decaying vegetation such as rotting logs, manures, and fallen leaves.

Next, we will discuss the types of food redworms will eat. They absolutely love vegetable wastes such as apples, coffee grounds, corn meal, breads, cucumbers, and many more. You may have noticed there is no meat on my list. Rotting meat can produce foul-smelling odors. Mice and rats may also go after the meat, and even eat your worms! Worms will eat meat, but it takes them quite a while.

Never use non-biodegradable structures such as plastics, aluminum foil, and glass because they can be harmful both to you and to your worms. When burying food, you can bury it many different ways. I dig trenches across the width and down the length of the worm box. After you have placed the garbage in the trenches, cover it up; the worms will find it. Be careful not to add too much food or the worms and microorganisms will not be fast enough to eat it all, causing odor. If you don't overload the system, the odor will be very low or not even there. My vermicompost actually smells kind of sweet!

When composting with worms, you have one of three goals. They are to produce fishing worms, worm castings for plants or a continuous supply of fishing worms and vermicompost. I am a "middle-of-the-roader". About every four months, I prepare fresh bedding and separate the worms from the old bedding.

Now, I shall discuss adding the vermicompost and castings to plants. When using vermicompost, use sparingly and selectively. It is loaded with humus, worm castings and decomposing matter. Use it in the bottom of holds when planting vegetables in your garden, or as a topdress on houseplants and vegetables. When using worm castings, you should be careful not to add too much to one plant because all the minerals present may turn to salt and inhibit the growth of the plant. Studies have shown that a diluted mix or worm castings with peat moss and perlite and better for plants than straight castings or straight peat moss. The plants with the three-part combination appeared to be more lush, and their growth was far more vigorous.

Earthworms play an important role in turning decaying organic material into a fertile soil. You may not see them at work, but they're there. The next time you get ready to step on one or put it on a hook, I'll bet you'll think twice about the value of earthworms!

Thank you! Are there any questions?

Commentary

The Sample:

- demonstrates the student's ability to communicate, orally and in writing, and work with younger students in an agricultural experience program
- shows the student's ability to conduct research for an extensive report
- indicates the student's knowledge of food waste composting, including the process called vermiculture.

Standard 3b—Career Majors: Natural and

Experiential

Student Work Sample

Context

A student in an agriculture education class conducted an experiment to determine if passing air through a high-voltage current will increase nitrate levels in the soil. The high-voltage current was created by using graphite electrodes to simulate lightning and a fan and sprinkler system to simulate wind and rain.

Performance Indicators

Students:

. . .demonstrate a solid base of knowledge and skills in natural and agricultural sciences

. . .demonstrate the ability to use technology to assist in production and distribution of food goods and services of today's agricultural industries

. . .prepare, maintain, interpret, and disseminate quantitative and qualitative pieces of information relating to the natural and agricultural sciences.

Applicant's Story: Indicate pertinent information relative to your agriscience project. Summarize how you selected your project, your personal management decisions, accomplishments, failures, any unusual events or circumstances affecting this enterprise and your current status and future goals.

Upon reading an article in our local newspaper in which David Mengel, Purdue University professor of agronomy, claimed that lightning triggers plant growth through converting nitrogen into ammonia, I began to wonder about other positive effects that lightning might have on the soil and plant growth. After much research on the subject, I came to the conclusion that the chemical reaction that lightning produces in the atmosphere could possibly be replicated in a controlled environment, and thus raise the nitrate level in the soil which would also stimulate plant growth under proper growing conditions.

After researching the subject, I began formulating designs for the miniature greenhouses. I determined that I would test the nitrate level and pH of the soil, runoff water, and incoming water. I decided to run my tests weekly and monitor the plants each day. I developed a chart to record my data on. I chose a fast growing corn for my experiment and determined the frequency of the electrodes and precipitation.

The data that I recorded showed the experiment plants that were exposed to electrified air, had consistently higher nitrate levels in the soil and water, which supported my hypothesis. Although the nitrate levels were higher in the experiment, the control plants had a healthier appearance. This may have been due to a lower temperature in the experiment as a result of venting the experiment outside the greenhouse and the control into the greenhouse, to prevent the airflows from mixing and being pulled back into the control. The frequency of the precipitation provided by the sprinklers had to be adjusted because the plants were becoming oversaturated. Initially the sprinklers were turned on with the electrodes in order to bring the electrified air into the soil.

Commentary

The Sample:

- demonstrates the student used learned knowledge on the natural process of nitrogen fixation by lightning to develop and conduct an extensive experiment to test a hypothesis related to soil nitrate levels
- shows the student applied technological knowledge and skills
- indicates the student applied various core- and specialized-level information management/ communications knowledge through a laboratory simulation.

The Electric Greenhouse

Abstract

The "Electric Greenhouse"
The Effect of Nitrogen Fixing Lightning
on Soil Nitrate Levels

Date: March - 1995

Purpose Statement: The purpose of this study is to determine whether or not passing air through a high-voltage current, created by using graphite electrodes to simulate lightning and a fan and sprinkler system to simulate wind and rain, will increase nitrate levels in the soil.

Hypothesis or Question: Will the natural process of nitrogen fixation by lightning be duplicated in an enclosed environment by passing air through a high-voltage current and simulating precipitation and wind with a sprinkler and fan result in higher soil nitrate levels?

Type of Research: Experimental

Population or Sample Used: Pioneer variety corn was grown in a mixture of 2/3 sand and 1/3 Hyponex potting soil. The soil was tested for nitrate and pH levels weekly. The nitrate levels and pH of the runoff and incoming water were also measured weekly for a total of 7 weeks.

Findings: The nitrate levels of the experimental plants were consistently higher than those of the control in both the soil and water. At one point the soil nitrate level of the experiment was higher than the starting point. The pH level showed little variance. The plants in the control had a healthier appearance than the experimental although they were about the same height.

Recommendations: Although a control was used, I would recommend a third setup with a known fertilizer value for an additional comparison. I would also recommend starting the experiment with a higher nitrate level. Research should be done to determine the effects of arc length on the process of nitrogen fixing and to measure the effects of the voltage and frequency of the electrodes.

The Electric Greenhouse

nitrate levels measured in parts per million Pioneer Variety Corn 3861

DATE	TIME	TEMP.	HUMIDITY	PH SOIL TAP CONTROL EXPERIMENT	PH WATER Runoff	Nitrate SOIL	Nitrate H_2O Runoff	PH H_2O	Nitrate H_2O	Outside weather conditions	Observations
Mon. 1/4/93	2:40	72°	44	7.2	—	35-20-15	—	7.3	8	Cloudy Rain .75" low 36° high 52°	Planted 7 3861 corn seeds
				7.2	—	35-20-15	—	7.3	8		planted 7 3861 corn seeds
Tues. 1/5/93										cloudy rain 1.6" low 28° high 53°	
Wed 1/6/93										Cloudy Snow .25" low 29° high 33°	
Thurs 1/7/93										Mostly Sunny low 29° high 36°	
Fri 1/8/93										cloudy clear snow 2" low 11° high 32°	1st plant growth noted - 7 plants
											8 plants
Sat. 1/9/93										Sunny low 1° high 17°	