

ART & TECHNOLOGY RESIDENCY

Maureen Milligan, M.S.Ed.

ABOUT THE ARTIST

Maureen Milligan has worked as an educator for the past 15 years in positions ranging from a private tutor to a 7th and 8th grade public school science teacher. In the fall of 1999, she started her own business, Tutorial Solutions, which provides tutorial assistance for mathematics and science students. In February 2000, she began work as the Project Assistant for the Professional Development District Demonstration Project (PD³P), a Dwight D. Eisenhower science education grant at Buffalo State College.

As well as working in education, Ms. Milligan has eight years experience working as an analytical chemist in the pharmaceutical industry. Ms. Milligan has a BS degree in Chemistry from Rochester Institute of Technology. In 1999, she earned an MS degree in Chemistry Education from Buffalo State College.

Her experience with computers began while she was in college and has led to extensive knowledge. She has used computers for her work in industry, for personal use, for teaching, and for her business.

Ms. Milligan is also very interested in art. She is a contributing member of the Albright-Knox Art Gallery, Burchfield-Penney Art Center, and Hallwalls Contemporary Arts Center and a supporter of local music, film, and performance art events.

ABOUT THE PERFORMANCE

GRADE LEVEL:

Middle School Level - Grades 6-8, ages 10-13

High School/Young Adult/ Adult Level - Grades 9-12, Ages 13-Adult

CURRICULUM CORRELATION:

Health, Physical Education, & Home Economics

Standard 2: A Safe and Healthy Environment

- Students will acquire the knowledge and ability necessary to create and maintain a safe and healthy environment.
- Students will follow health and safety procedures related to computer/electronics use: they will not eat or drink in the area of the

computer equipment and will wash their hands as a preventative measure against spreading disease. They will learn to care for the equipment and to maintain a safe work area.

Standard 3: Resource Management

- Students will understand and be able to manage their personal and community resources.
- Students will understand practical uses of computers to which they have access in their homes, libraries, schools, or community centers. The software used for instruction (MSPaint & MSWord) was chosen because it is accessible and available on most computers to which students have access. More advanced software (e.g. Core/Draw, PrintMaster, etc.) could have been used, but it was recognized that students need to learn with software they can use in the future, i.e. software to which they have access on the computers in their communities.

Mathematics, Science and Technology

Standard 2: Information Systems

- Students will access, generate, process, and transfer information using appropriate technologies.
- Students will use current computer technology to duplicate existing images and create original art projects. Students will learn the following skills using the technology: booting-up/shutting down the system; using a PC/Windows operating system to run specific programs; opening/closing/using MSPaint and MSWord/Works; saving files on the hard drive and a floppy disk; transferring files/images from one software program into another (specifically -- transferring MSWord/Works images into an MSPaint program); previewing printing; and printing (in color and black & white) a final product.

Standard 5: Technology

- Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.
- Students will produce several finished art projects and prepare and display these projects during a formal showing -- sharing their work with the community.
- Students will learn how the computer allows them to create artwork that would otherwise be difficult and/or tedious to produce. Specifically, with the Tessellations Project, students will see that once the primary image is designed, it is extremely efficient to copy it many times using the computer instead of reproducing it manually, to produce an interesting pattern and finished project.
- Students will also learn that there are effects that are best produced by a computer program and others that are easier to produce manually -- depending on the effect one wishes to achieve.

Standard 6: Interconnectedness: Common Themes

- Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.
- Students will learn, especially while producing the Tessellations Project, that mathematics can be used to produce art -- thus connecting art and mathematics.
- And again, students will learn that there are effects that are best produced by a computer program and others that are more easily produced manually -- depending on the effect one wishes to achieve.

Standard 7: Interdisciplinary Problem Solving

- Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.
- Students will learn that they can use a computer with basic graphic programs, such as MSPaint, to produce art. They will produce art projects that they could use/build on in the future, such as the Business Card Design, Letterhead, and Resume Projects.

English Language Arts

Standard 1: Language for Information and Understanding

- Students will listen, speak, read, and write for information and understanding. As listeners and readers, students will collect data, facts, and ideas; discover relationships, concepts, and generalizations; and use knowledge generated from oral, written and electronically produced texts. As speakers and writers, they will use oral and written language that follows the accepted conventions of the English language to acquire, interpret, apply, and transmit information.
- Students will use listening and reading skills extensively.
- They will listen to and read instructions about the use of the software and the expectations for the finished projects.
- Students will learn how to use the "Help" features of all of the software (which requires extensive reading and comprehension) and be expected to use this feature. The instructor will require that all students look first for the answers to their questions, using the "Help" feature, before individual assistance will be given by the instructor.
- Several of the projects are accompanied by written instruction sheets which require reading and comprehension in order to successfully complete the project.
- There is a written scoring rubric for each project, which requires reading and comprehension in order to successfully complete the project.
- The business card design, letterhead, and resume projects require the use of acceptable writing skills in order to successfully complete these projects.

The Arts

Standard 1: Creating, Performing, and Participating in the Arts

- Students will actively engage in the processes that constitute creation and performance in the arts (dance, music, theatre, and visual arts) and participate in various roles in the arts.
- Students will produce several specific art projects. These projects will involve both creating original artwork and incorporating existing art into a project.

Standard 2: Knowing and Using Arts Materials and Resources

- Students will be knowledgeable about and make use of the materials and resources available for participation in the arts in various roles.
- Students will be able to use a computer to produce both original art and art that incorporates existing art into specific art projects.
- Students will understand when it will be advantageous to use a computer to produce art and when it will not be necessary to use a computer -- thus utilizing materials and resources effectively.
- Students will learn to preview and print drafts of work, before using the color printer to print their work -- thus learning how to conserve printing paper and ink resources. Students will make projects that are designed so that they can be printed out in black and white and still be as effective artistically as a color version because, practically speaking, color printing is much more expensive and may not always be available.

Standard 3: Responding to and Analyzing Works of Art

- Students will respond critically to a variety of works in the arts, connecting the individual work to other works and to other aspects of human endeavor and thought.
- Students will use rubrics that incorporate some critical review to produce their art projects, thus allowing self-evaluation.
- Students will show their work to their community and families, thus experiencing critical response and allowing them to respond to their fellow students' work.

Standard 4: Understanding the Cultural Contributions of the Arts

- Students will develop an understanding of the personal and cultural forces that shape artistic communication and how the arts in turn shape the diverse cultures of past and present society.
- Students will be able to tap into a variety of cultural artistic forces to produce their art projects. Several of the projects are extremely open-ended and therefore allow students to express themselves culturally. Examples of projects that employ a variety of cultural expressions are incorporated into the instruction -- including, as examples, work of past students who often display cultural identity in their artwork.

Career Development and Occupational Studies

Standard 1: Career Development

- Students will be knowledgeable about the world of work, explore career options, and relate personal skills, aptitudes, and abilities to future career decisions.
- Students will learn the variety of professions that use art and artists. Students will produce art projects (the Business Card Design, Letterhead, and Resume Projects) that they can use in the future for job-hunting or promoting themselves in the job market.

Standard 2: Integrated Learning

- Students will demonstrate how academic knowledge and skills are applied in the workplace and other settings.
- Students will be able to demonstrate that they can produce and know how and when to use their work for career-building purposes. Since they will be learning popular and common software applications, they will be able to use these skills in the workplace in the future and apply this knowledge to other programs, since the basic tools and terminology are similar, if not exactly the same, for many of the popular, more complex programs. The course emphasizes how these programs are used in the workplace or for self-employment. Students learn the names of the applications they use and how they parallel other programs.

THE PERFORMANCE

This Art & Technology program includes very practical and useful applications of computer art. Projects created during the class include: image duplication; original images; business cards, letterhead, and resumes for a real or fictitious business; postal stamp design; tessellation; and stained-glass window design.

The class also allows students to compare creating art on the computer to creating art by the “pencil and paper” technique. Many of their projects are first sketched out on paper and then transferred to the computer. Therefore, students directly experience the advantages and disadvantage of using a computer to create art. They begin to understand what type of art is easily transferred to the computer and what is not. They also begin to see what type of art is uniquely suited for computer application, such as designs involving repetition and geometrics.

Most of the art is created using the graphics program MSPaint. This program is used purposely, since MSPaint is available on almost all computers to which students have access. Therefore, in the future, students will be able to readily use the skills they have mastered during this Art & Technology program.

The Art & Technology Residency will consist of instructional classes led by the artist and students who have had experience with the program. The classes will be held once per week, for a 45 minute or 1 1/2 hour session. The students will

learn how to use the basic tools of the MSPaint software to create art. Various projects, with an emphasis on Careers in Art and Career Development, will be assigned by the instructor.

Each project is scored by using a scoring rubric specific to that project. Students will earn points as a way of critiquing and assessing their work.

Most of the projects will require that students first draw/sketch out their ideas on paper as a draft. Before they can begin working on the project on the computer, this manually produced draft will be approved by the instructor.

Several projects are accompanied by written instructions guiding students on how to perform tasks; thus, good reading and comprehension skills will be helpful. Students with poor reading skills can be paired with students with more developed reading skills.

After 9 sessions are completed, the students and artist will prepare all projects for display during a reception, where students can share and discuss their work with their families and community.

GOALS

General goals of this program are:

- to teach very practical and useful applications of computer art
- to enhance students' reading comprehension and writing skills
- to demonstrate to students the practice and perseverance necessary to transfer their artistic ideas to the medium of a computer
- to use the computer as a tool to perform tasks that are difficult to do by hand (i.e. repetition, geometric forms, etc.)
- to use equipment and software to which students will have access in the future
- to teach students basic computer art skills that they can use in many other computer applications (i.e. word processing, resource management, file management, etc.)

OBJECTIVES

Students who attend the sessions regularly will complete the following projects:

PROJECTS

- MSPaint Mastery of 20 Tasks
- Duplicate Assigned Image Project
- Create Original Image Project
- Business Card Design Project
- Letterhead Project
- Resume Project
- Postal Stamp Design Project
- Tessellations Project
- Stained Glass Window Design Project

Many of the popular drawing software programs are very similar to MSPaint, and mastery of skills used with this software will be transferable to the more advanced graphics software programs. Computer art skills mastered will include the following:

COMPUTER ART SKILLS (MSPaint)

- drawing lines
- drawing free-form lines
- curved lines
- circles
- rectangles
- polygons
- painting
- air brush
- erasing small images
- erasing large images
- undo
- select part of an image
- copy
- paste
- type text
- change size of image
- zoom in/out
- flip/rotate
- insert Graphics/Clip Art from MSWord into MSPaint

GETTING READY FOR THE PERFORMANCE

A FEW WEEKS PRIOR TO THE PERFORMANCE:

All sessions are in preparation for the final showing and reception that is held after each 9 weeks of instruction. After each project is completed, students prepare, mount, and sign the final work in preparation for display during the showing. The final work is scored and placed in their individual folders until the showing.

ON THE DAY OF THE PERFORMANCE:

The final work is put up on display. Students' names are printed out in large print and placed above their work. Each project is labeled with the project name and student's name and hung in a section put aside for each student. Students' score sheets that are a record of completed projects are also displayed with the work.

HAVE YOU STUDENTS WATCH AND LISTEN FOR:

Students are encouraged to evaluate and review each other's work. The individual rubrics for each project should be used as a guide. Some of the points looked for in all of the projects are:

- Contains graphics/art work that are related to the subject of the project

- Layout makes information easy to read and understand
- Design is good for printing in black and white as well as color

AFTER THE PERFORMANCE

- Students can continue improving the projects they produced for the performances.
- Students can develop some of their own ideas for projects and draft a rubric for it that will incorporate the skills they have learned.
- Teaching other students, especially younger students, the skills they learned is highly recommended.
- Students who can get access to more advanced software for drawing and design can begin to use this new software to produce art projects.

EVALUATION

Students who have completed the assigned projects following the rubric guides will have demonstrated that they have achieved the following objectives:

- basic knowledge of using computers (turning on/shutting down the computer; opening and closing programs; switching between programs; saving and editing work; previewing work; printing drafts; printing final projects; word processing, resource management, file management, etc.)
- Students can use the "Help" feature of any program effectively
- Students will be able to determine whether or not transferring an artistic idea to the computer will be difficult or enhanced by the tools the computer allows them to access.
- Students can name the software programs they have learned and understand how they can be used as a tool in the future workplace.

VOCABULARY

(definitions from Webopedia: <http://www.webopedia.com>)

booting up: (v) To load the first piece of software that starts a computer. Because the operating system is essential for running all other programs, it is usually the first piece of software loaded during the boot process.

CorelDraw: A graphics program that enables you to draw pictures, then store the images in files, merge them into documents, and print them. Unlike paint programs, which represent images as bit maps, draw programs use vector graphics, which make it easy to scale images to different sizes. In addition, graphics produced with a draw program have no inherent resolution. Rather, they can be represented at any resolution, which makes them ideal for high-resolution output.

floppy disk: A soft magnetic disk. It is called floppy because it flops if you wave it (at least, the 5 1/4 inch variety does.) Unlike most hard disks, floppy disks (often called floppies or diskettes) are portable because you can remove them from a disk drive. Disk drives for floppy disks are called floppy drives. Floppy disks are slower to access than hard disks and have less storage capacity, but they are much less expensive and, most importantly, they are portable.

hard drive: The mechanism that reads and writes data on a hard disk. Hard disk drives (HDDs) for PCs generally have seek times of about 12 milliseconds or less. Many disk drives improve their performance through a technique called caching.

“Help” features: Online documentation. Many programs come with the instruction manual, or a portion of the manual, integrated into the program. If you encounter a problem or forget a command while running the program, you can summon the documentation by pressing a designated Help key or entering a HELP command. In Windows, the Help key is the function key labeled F1.

manually: producing with pencil and paper

MSPaint: Microsoft Paint - a graphics program that enables you to draw pictures on the display screen which are represented as bit maps (bit-mapped graphics.) In contrast, draw programs use vector graphics (object-oriented images), which scale better.

MSWord/Works: Microsoft Word and Microsoft Works - word processing programs (see “word processing” defined below)

Printmaster: an example of software in the category of Desktop Publishing. A desktop publishing system allows you to use different typefaces, specify various margins and justifications, and embed illustrations and graphs directly into the text. The most powerful desktop publishing systems enable you to create illustrations, while less powerful systems let you insert illustrations created by other programs.

PC/Windows operating system: PC - short for personal computer or IBM PC. The first personal computer produced by IBM was called the PC, and increasingly the term PC came to mean IBM or IBM-compatible personal computers to the exclusion of other types of personal computers, such as Macintoshes.

program: (n) An organized list of instructions that, when executed, causes the computer to behave in a predetermined manner. Without programs, computers are useless.

rubric: Scoring rubrics are descriptive scoring schemes that are developed by teachers or other evaluators to guide the analysis of the products or processes of students' efforts (Brookhart, 1999). Scoring rubrics are typically employed when a judgment of quality is required and may be used to evaluate a broad range of subjects and activities.

shutting down: To turn off the power.

software: Computer instructions or data. Anything that can be stored electronically is software. The storage devices and display devices are hardware.

The terms software and hardware are used as both nouns and adjectives. For example, you can say: "The problem lies in the software," meaning that there is a problem with the program or data, not with the computer itself. You can also say: "It's a software problem."

tessellations: A collection of shapes that fit together to cover a surface without overlapping or leaving gaps.

Windows - Short for Microsoft Windows - a family of operating systems for personal computers. Windows dominates the personal computer world, running, by some estimates, on 90% of all personal computers. The remaining 10% are mostly Macintosh computers. Like the Macintosh operating environment, Windows provides a graphical user interface (GUI), virtual memory management, multitasking, and support for many peripheral devices.

word processing: Using a computer to create, edit, and print documents. Of all computer applications, word processing is the most common. To perform word processing, you need a computer, a special program called a word processor, and a printer. A word processor enables you to create a document, store it electronically on a disk, display it on a screen, modify it by entering commands and characters from the keyboard, and print it on a printer.

Descriptions of Projects:

MSPaint Mastery of 20 Tasks

Students are given exposure to and opportunity to practice with the capabilities of the software "MS Paint."

Duplicate Assigned Image Project

Using the skills mastered during the "20 Tasks," students will produce, with MSPaint, a duplicate of an assigned image. The Duplicate Assigned Image Project rubric will be used as a guide.

Create Original Image Project

Using the skills mastered during the "20 Tasks," students will produce, with MSPaint, an image of their original design. The Create Original Image Project rubric will be used as a guide.

Business Card Design Project

Students will create an original business card design using MSPaint and MSWord/Works to import graphics. The Business Card Design Project rubric will be used as a guide.

Letterhead Project

Students will create an original letterhead design that will coordinate with the Business Card Design Project, using MSPaint and MSWord/Works to import graphics. The Letterhead Project rubric will be used as a guide.

Resume Project

Students will create an original resume design that will coordinate with the Business Card Design PROJECT and the Letterhead PROJECT, using MSPaint and MSWord/Works to import graphics. The Resume PROJECT rubric will be used as a guide.

Postal Stamp Design Project

Students will complete a project of their originally designed postal stamp, using the Postal Stamp Design PROJECT rubric guidelines. MSPaint and MSWord/Works will be used.

Tessellations Project

Students will create an original tessellation design, using MSPaint. The Tessellations PROJECT rubric will be used as a guide.

Stained Glass Window Design Project

Students will create an original stained glass window design, using MSPaint. The Stained Glass Window Design Project rubric will be used as a guide.

REFERENCES

THE KIDLINK WORLDWIDE ART and COMPUTER ART EXHIBITION -- "In this gallery we aim to show art produced by children all over the world that are up to 15 years old."

(<http://www.kidlink.org/KIDART/>)

Student Computer Art Society/SCAS/ web site -- Here you will find information about student and youth projects, addresses of organizations and foundations, NGO future activities, art and computer projects, as well as lots of other useful information.

(<http://www.scas.acad.bg/>)

Museum of Computer Art -- MOCA is one of the most heavily-trafficked, comprehensive, frequently-updated and respected computer art museums on the Web.

(<http://www.museumofcomputerart.com/index.asp>)

Tantalizing Tessellations!! --Vivian Archambault, Danielle Desjardins, and Terry Wood Abstract: This unit was written by three students as a project in a mathematics education class, EdMath 215, at the University of Regina.

(<http://MathCentral.uregina.ca/RR/database/RR.09.96/archamb1.pdf>)

A Tessellation Activity for Grade 6 Mathematics Using "Paintbrush" or "Paint"
from "Bits and Bytes" Vol. 14 No. 1, Oct. 1997; article by Brian Metcalfe -
Technology Education
(<http://www.wsd1.org/bitsbytes/9798/bboct97/default.htm#STORY4>)