Using Contemporary Art to Facilitate Learning across the Curriculum

Preparing students to meet the challenges of the 21st century

Developed by
Anita LeJeune, the Arts Council of Greater Baton Rouge
and Louisiana Public Broadcasting
with the Louisiana Department of Education
through a grant from Art21

Introduction

The purpose of education in the 21st century is to develop productive citizens with skills to function in real life, in the workplace, and in the world. An even greater challenge for education is to develop life-long learners who will have the skills to seek new information throughout their lifetimes so their knowledge, skills, and interests continue to enrich their lives and keep pace with the demands of the workplace and the world.

Through the study of the arts, students develop knowledge, emotional, social, and physical skills within a particular context. They learn to be creative and flexible and expressive, to analyze, critique, discriminate, and problem solve. In addition to the study of visual art as its own discipline, the arts can enhance the content of other subject areas and bring richness and a new perspective to common core subjects.

Demonstration materials

The purpose of this document is to demonstrate how activities, using contemporary art, can not only teach about art, but can also be used across the curriculum to teach concepts within other disciplines.

Content Standards for Art

The content of the demonstration materials was developed to align with some standards and benchmarks within The Louisiana Content Standards Foundation Skills and The Louisiana Arts Content Standards. Where applicable these standards are cited.

The Louisiana Content Standards Foundation Skills (Appendix 1) defines five broad curriculum outcomes that all students in all disciplines should demonstrate: 1) communication, 2) problem solving, 3) resource access and utilization, 4) linking and generating knowledge, and 5) citizenship. These are the numbers 1 through 5 after the benchmarks.

In addition, the Louisiana Arts Content Standards, revised in 2003, specifies what students should be able to do or should know in the areas of Dance, Music, Theatre Arts, and Visual Arts. Within the section for the Visual Arts, standards and benchmarks address creative expression, aesthetic perception, historical and cultural perspective, and critical analysis (Appendix 2). The demonstration materials in this document focus on selected standards and benchmarks within the Visual Arts only.

INSTRUCTIONAL STRATEGIES

I. Analyzing a Work of Art: Aesthetic Perception and Critical Thinking
(Can be adapted to be age appropriate for any grade level.)

Foundation:

1. What is Contemporary Art? Contemporary art can be defined as art produced in the present time or art produced since World War II. This is a broad definition at best. Contemporary artists of today work in a variety of materials and styles, and their works often contain a deeper meaning within a seemingly unorganized idealism. Contemporary art often requires viewers to complete the work of art through their own interpretations.
2. Everyone who encounters a work of art brings a set of unique experiences that profoundly affect how they respond to that work of art. Viewing and analyzing a work of contemporary art as a classroom activity is useful because students can think critically about a piece, express what they perceive, research and analyze other data sources, focus their thinking, articulate their interpretation, explore the perceptions of others, and develop respect for the perception of others.
3. Not all art refers to a story or human event.
4. The nature of each work of art determines the best questions to consider.
   For example: Guessing what the story is in an abstract expressionist painting is an example of trying to fit a referent to art that does not refer to anything or may refer to circumstances or situations that are different.
5. Art should be a contemporary piece, rich in context or meaning.
6. Look for art with people, places, times and, or events.
7. Look for images containing elements which could deal with issues, e.g. environment, industry, human condition.
8. It is not necessary for students or teachers to know exactly what the artist was trying to communicate. Most of the time we view contemporary art with no supporting explanation such as title, artist's name, and media used, concept, or meaning.
9. Students should derive their own interpretations and be able to explain their decisions.

Teacher goals:

1. create a community of inquiry,
2. help students recognize that each may have different responses to and attribute different meanings to a work of art,
3. help students create their own questions that lead to more in-depth study or research,
4. help students derive and articulate their own interpretations,
5. facilitate complex reasoning (higher order thinking) by relating the work of art to common core subjects, and

6. help students realize that what is learned in school goes beyond the classroom.

Student goals:

(See Visual Arts, Aesthetic Perception, Benchmarks 1-6 for grade specific goals and Visual Arts, Critical Analysis, Benchmark 1, k-4, 5-8. The numbers from 1-5 behind the specific benchmarks refer to the appropriate foundation skills.)

1. use the elements and principles of design and art vocabulary to respond to works of art;
2. recognize and respond to beauty as defined by different cultures and tastes;
3. explore the beauty in nature and the natural environment as reflected in works of art;
4. demonstrate awareness of new ideas, possibilities, options, and expressions, and situations in art;
5. discuss what art is and express personal responses, feelings, and preferences
6. describe the use and value of visual arts in daily life, the workplace, and the community; and
7. analyze how design elements and principles are used to achieve an aesthetic effect.

As a result of analyzing a contemporary work of art, students will:

1. Know
   a. contemporary art contains a variety of styles, techniques, and characteristics that reflect various issues, cultures, and subjects.
   b. contemporary art has been used to communicate ideas, themes and messages throughout history.
   c. there are multiple possibilities for artistic expression.
   d. elements of art and principles of design.

2. Be able to
   a. weigh evidence and information, examine intuitive reactions, and articulate personal attitudes toward visual work.
   b. communicate information clearly, fluently, critically and creatively in the classroom and later in society.
   c. validate these opinions, and value and respect differing opinions.
   d. critique works of art using advanced art vocabulary.
   e. recognize links to various other subject areas.

3. Appreciate
   a. viewing contemporary art serves a dual purpose: to provide an art experience and is a way for students to develop and demonstrate their knowledge and understanding of an area of study.
   b. opinions of others.
   c. how contemporary art develops learning and social skills.

4. Develop
    a. aesthetic perception through the knowledge of contemporary art and respect for their commonalities and differences.
    b. verbal and observational skills for critical analysis and for individual expression of ideas.
    c. historical and cultural perspective by recognizing and understanding that the arts throughout history are a record of human experience with a past, present, and future.

II. Strategy for Analyzing Art

1. Conceal the title of print to prevent the title from influencing the interpretation.

2. Show the work of art to the students. Individual photocopies would be best; however if sufficient copies are not available, give each student a moment to view the picture.

3. Create a community of inquiry by having students list what they see within a work of art.

4. Use one or more of three types of inquiry to facilitate analysis:
    a. **Descriptive inquiry** explores the technical properties in the work of art.
    i. Students describe, verbally or in writing, the elements they see:
        - Objects (furniture, chairs)
        - People and what they are doing (their poses, are they relaxed)
        - Setting/environment (time of day; if indoors; type of room; if outdoors, what type of weather, landscape)
        - Composition (how is the picture organized)

        [Example of a descriptive statement: The painting shows a nude woman holding a globe.]

    ii. Describe the elements of art and principles of design seen within the work. (see Section VI)
        - Line
        - Shape
        - Value
        - Space
        - Texture
        - Color
        - Contrast
        - Unity
        - Emphasis
        - Balance proportion/scale
        - Rhythm/repetition

    b. **Interpretative inquiry** goes beyond basic description and explores what the artist was intending to communicate. Students should develop and justify personal interpretations of works of art based on information inside and outside the work. Ask students: What do you think the artist was intending to communicate? Does it tell a story? What is happening in the work of art? What do you think the art is about? How do you justify your interpretation? Ask students to verbalize artist's intentions from elements within the work:
        - Theme: based on elements in the work or issues it represents
        - Mood: how are people feeling? what do their expressions suggest?

- Meaning of work: what is the message? is there a message? are there any symbols?
- Use knowledge of design elements and principles to analyze, compare and contrast the composition.
- Why did the artist use certain elements within the work of art? [Example of an interpretative statement: The artist wanted us to see the woman embarrassed by her nudity.]

c. **Evaluative inquiry** judges a work's value or significance. Teacher should ask students to support their statements with an explanation of what helped them come to their conclusion. This fosters higher levels of thinking while learning to verbalize student's ideas and using appropriate art vocabulary.
Ask students to share their judgments: (Evaluative)
   - Students form opinions and make judgments with supporting information.
   - Do you like or dislike this painting? Students may not have a judgment, so ask them how this work of art makes them feel.
   - Does it compare with other works of art that you have viewed in the past? Examples should be for the contemporary time period.
   - Students decide where a work like this should be viewed in society, and if this piece has value.
     [Example of an evaluative statement: This painting is better than the other one I saw because…]

5. Ask students to share ideas for the picture's title.

6. Invite students to share their views about the artwork.

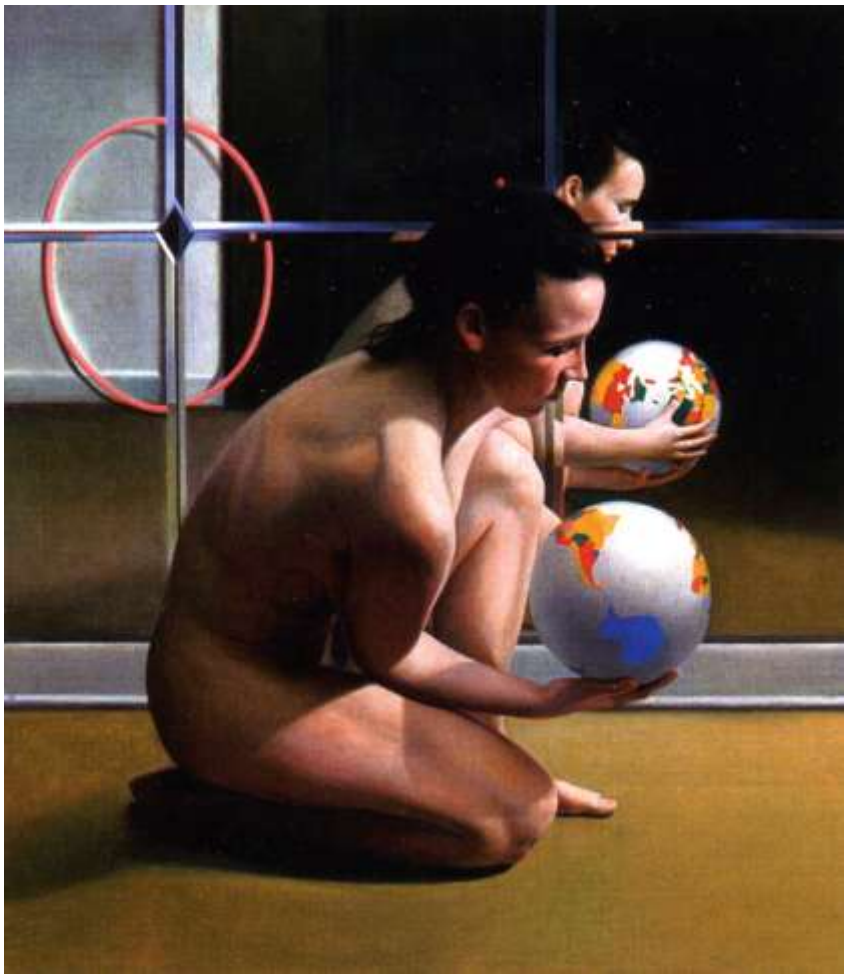
III. Relating Contemporary Art to the Sciences

The preferred method of teaching science is to minimize rote learning and involve students in "actively exploring ideas through activities they can relate to their own lives. Students often work cooperatively in small groups to exchange and critique their own ideas, with the teacher facilitating discussion rather than providing answers. Science is presented as a human enterprise and a continuing process for extending understanding, instead of the ultimate, unalterable truth. Learning activities are often interdisciplinary, stressing the connections between the sciences and other subjects. Science teachers must have a solid understanding of the basic concepts and processes of science in order to construct meaningful science activities that address all students' diverse experiences and learning styles."

(Chapter 3. The Teaching and Learning of Science, Section 305. Instructional Issues. Louisiana Content Standards, Benchmarks, and Grade Level Expectations for Science, Bulletin 1962)

Processes that facilitate learning involve using knowledge by having students describe, explain, predict, design, and analyze; constructing new knowledge by asking questions, solving problems, interpreting text, reconstructing prior knowledge; and reflecting on knowledge by justifying criticizing, describing limits, making connections, taking perspectives, and describing interactions.

The following demonstrates how teachers may use these processes with students to teach a lesson in a science curriculum. The image used in these demonstration materials was created by Kenju Urakubo and was used with his permission.



Title: Cora 1, Artist: Kenju Urakubo, Jackson Heights, NY .
Used with permission of the artist.

Strategy for Relating Art to Science

In addition to an aesthetic analysis as described above, teachers can lead students into an analysis of a work of art from the perspective of a particular subject area, such as biology or environmental study.

1. Determine which GLE's will be used in the lesson. (see Appendix 3)
   These demonstration materials will show how to use art in biology and environmental study:

   Life Sciences. (Recommended for Grade 10)

   7. Personal and Community Health

   a. GLE 37: Explain how fitness and health maintenance can result in a longer human life span (LS-H-G1).

   Life Science

   1. interdependence of organisms, which includes:

   d. LS-H-D4: exploring how humans have impacted ecosystems and the need for societies to plan for the future (1, 2, 4, 5);

Science and the Environment

4. personal choices and responsible actions:

a. SE-H-D1: demonstrating the effects of personal choices and actions on the natural environment (1, 2, 3, 4, 5);

2. Have students compile a list of science vocabulary words in relation to area being studied. (Review the art vocabulary in Section VI for cross-curricula terms.)

3. Tell the class you are going to have the "Obvious Discussion." The obvious discussion is about nouns related to a particular subject found within the artwork. This step is about what they see. No interpretation at this point.

4. Select a track for connecting this image to science and guide students to explore the connection. For example:

a. Investigation of the living environment through which students will become aware of the characteristics and life cycles of organisms and understand their relationship to each other and to their environment. (Life Science).

Possible areas for connecting the image to biology: fitness, muscular system, seems to be a dance workout room, female, reproductive system by suggestion of symbols of sexes, does reflection suggest reproduction?

Give students a specific perspective or interpretation on biology by saying: "Let's say this picture is about biology, do you see any symbolism of sexes?" Tell them that everything the artist put in the picture has some meaning connected to the perspective you introduced. The student's task is to uncover the "secret "meaning. For example" If this picture is about biology, why did the artist paint the nude?" "What does a circle represent?" The symbol in biology for female, ♀, includes a circle, lines and angles. The male symbol, ♂, includes a circle, line and angles. "Do you see a male symbol or any portion of a male symbol anywhere?" "Could the reflection mean reproduction?"

b. Environmental education will develop a literate citizenry which is aware of and shows concern for the total environment and its associated problems. Students will develop an appreciation of the natural environment, learn the importance of environmental quality, and acquire a sense of stewardship. They will be able to recognize how our personal, professional, and political actions affect the natural world (Science and the Environment).

Connection to environmental sciences: Does the reflection mean we are responsible for our environment? Could the woman carefully holding the world suggest how fragile our environment is? Is what we do now to our environment a reflection of how generations to come will treat the environment?

Give students a specific perspective for an environmental interpretation by saying: "Let's say this picture is about the environment." Tell them that everything the artist put in the picture has some meaning connected to the perspective you introduced. The student's task is to uncover the "secret

"meaning. Does the reflection mean we are responsible for our environment? Could the woman carefully holding the world imply how fragile our environment is? Is what we do now to our environment a reflection of how generations to come will treat the environment? How much importance do you put toward your involvement in the environment? Which cultures are more environmentally conscious? What part does society play in the world around us? How do our personal actions affect the natural world? How do political actions affect the world? How do our professional actions affect the world? This could lead into a discussion of natural resource allocation or oil demand and political ramifications. Is it significant that the model is nude in the painting which represents no culture and no government? Does anything in the painting give any political information?

5. Ask students to analyze the work of art and give descriptive words and interpretative and evaluative statements as previously described.

    a. Descriptive words
    In biology descriptive words used for this image could be: world, male/female, gender symbolism, health/fitness, and nudity.

    In environment analysis examples of descriptive words could be: environment, world, building materials, organic/inorganic objects, shyness, grid, globe, cultures, environmental reflection, and boundary. Remind them to choose words related to science topic chosen.

    b. Interpretative statements

    In biology interpretative statements could be: the artist is trying to communicate about sexuality using the female as a symbol of hope and indicating that creation continues. (Leading questions: Why was a female used instead of a male? What type of room do you think this is? Exercise room? Does it represent physical fitness? Do you think there is any male symbolism in this picture? Is the use of the globe symbolic of our life span?)

    In environmental study an interpretative statement could be: The nude woman demonstrates the fragility of our environment. (Leading questions: Why is the figure gently holding the globe? Does anything about this image tell us anything about the environment?)

c. Evaluative statements

In biology evaluative statements could be derived from these questions: Is this painting a good example of how important reproduction is? Does it show the importance of health and fitness throughout the world? Do you think the world should be more conscious of biological health and fitness? Is it important that we, as citizen, take our health seriously?

In environmental study, evaluative statements could be derived from these questions: Do you think this is a good example of showing the connection of female reproduction to environmental replenishment? Where would the painting be hung to have an impact? Would you think that the general public would see this painting in the same way you do? What do you like/dislike about the painting? Do you think this painting shows how fragile the environment is, what would be a stronger statement?

6. Ask the students to give a title to the picture. This could be done in groups of two or three students.

8. Reveal the title to the students and have them determine which aspects of the image are important related to biology or the environment. This helps close the exercise.

IV. Examples of Other Connections to Science GLEs:

Biology (Recommended for Grade 10)

Interdependence of organisms

e. GLE 27: Analyze positive and negative effects of human actions on ecosystems (LS-H-D4) (SE-H-A7).

Personal and Community Health

a. GLE 37: Explain how fitness and health maintenance can result in a longer human life span (LS-H-G1).

Systems and Behavior of organisms

c. GLE 34: Explain how body systems maintain homeostasis (LS-H-F2).

Environmental sciences: Benchmarks 9-12

Environmental Awareness and Protection, (SE-H-C1)

b. GLE 20: Relate environmental quality to quality of life (SE-H-C2).

c. GLE 21: Analyze the effect of common social, economic, technological, and political considerations on environmental policy (SE-H-C3).

Personal Choices and Responsible Action

c. GLE 26: Determine local actions that can affect the global environment (SE-H-D4).

d. GLE 27: Describe how accountability toward the environment affects sustainability (SE-H-D5).

(Bulletin 1962—Louisiana Content Standards, Benchmarks,and Grade Level Expectations for Science, http://www.doa.louisiana.gov/osr/lac/28v123/28v123.pdf). The complete listing of GLEs are available at the Louisiana Department of Education web site.

V. Creation of Student Artwork Related to Science:

1. Create a collage using images from magazines or newspapers depicting environmental concerns of today.
2. Suggest that students think about: our role in the environment; public safety i.e. industry pollution, presence of lead paint, import safety standards, enforcement of import safety standards; air quality, what part does industry play in preserving our environment, what could we do as a society to protect the environment or make people aware of the fragility of the environment; is environmental conservation important, should we even be concerned about the environment?
3. Have them develop and be able to articulate a point of view or their thinking behind their creation.
4. Name the artwork.
5. Pieces could be displayed in the classroom and discussed.

VI. Using Art to Teach Geography and Math

The following are examples of questions that could be posed, using the same art image, to teach geography and math for the specified standards and GLEs.

Social Studies

Louisiana Social Studies Strands
A. Geography: Physical and Cultural Systems: Strand
1. Students develop a spatial understanding of Earth's surface and the processes that shape it, the connections between people and places, and the relationship between man and his environment.
Benchmarks 9-12
2. Places and Regions
d. G-1B-H4: Explaining and evaluating the importance of places and regions to cultural identity (1, 2, 3, 4, 5);

Probing questions and inquiry using the same image:

Where is the woman from? Why is she nude? Is it of any importance that she seems to be alone? Could her nudity suggest that she could fit into any society? How could different cultures perceive fitness and weight differently? Would she be considered to heavy or to thin in some cultures? How many countries can you find? Does reflection in mirror help us to see more of the globe? What significance is attire in cultures? Which cultures are known because of the way they dress? What are some other ways in which cultures are distinguished?

Benchmarks 9-12
3. Physical and Human Systems
d. G-1C-H4: Analyzing the characteristics, distribution, and interrelationships of the world's cultures (1, 2, 3, 4, 5);
29. Analyze the current and future impact of population growth on the world (e.g., natural resources, food supply, standard of living) (G-1C-H3)
4. Environment and Society
40. Analyze or evaluate strategies for dealing with environmental challenges (e.g., dams or dikes to control floods, fertilizer to improve crop production) (G-1D-H2)

Probing questions and inquiry using the same image:

Ask students to identify physical and human characteristics seen within the image, (G-1B-H1). Choose a place seen on the globe in the image and name an aspect known to that particular region, i.e.; landforms, cultural norms, language.

Math

The study of measurement connects numbers and the real world and uses activities, individually or in groups, that explore real-world problems through the use of manipulatives. The activities should help develop communication, reasoning and problem solving skills. Students in grades 9-12 should be able to select and use appropriate units, techniques, and tools to measure with a specified degree of accuracy.

Geometry is the study of physical shapes found within the natural world and should center around activities in which communication, reasoning and problem solving skills are developed. Manipulatives, technology, and construction materials should enhance the activities.

Specific GLEs for this demonstration are:

Measurement: 9th grade

GLE 21. Determine appropriate units and scales to use when solving measurement problems (M-2-H) (M-3-H) (M-1-H)

GLE 22. Solve problems using indirect measurement (M-4-H)

Measurement: 10th grade

GLE 7. Find volume and surface area of pyramids, spheres, and cones (M-3-H) (M-4-H)

Geometry: 9th grade

GLE 23. Use coordinate methods to solve and interpret problems (e.g., slope as rate of change,intercept as initial value, intersection as common solution, midpoint as equidistant) (G-2-H) (G-3-H)

Geometry: 10th grade

GLE 11. Determine angle measurements using the properties of parallel, perpendicular, and intersecting lines in a plane (G-2-H)

Probing questions and inquiry using the same image:

List the geometric shapes within the image. Is there a sphere? What is its volume? With the information given, could we determine the size of each rectangle forming the grid in the background? What is the circumference of the circle? Have students estimate size difference between the two spheres. How many right angles, parallel lines, and angles can you find?

VII. Art Vocabulary

Teachers can familiarize students to the language used in art. Many can be crossed referenced with core curriculum subjects.

Elements of Art

Line

The path of a moving point. Can be straight, curvy, thick, or thin.

Shape

A shape is line that makes a form. A shape can be inorganic or organic.

Value

Lightness or darkness – shading or color can be light in value (yellow) or dark in value (black). There are many ranges of value.

Space

Positive space- Area within objects
Negative space- area around or between objects

Texture

Feeling of the surface of an object or can be implied through drawing

Color

Primary: Red, Yellow, and Blue – all colors come from these
Secondary: Orange, Green, Purple- mixture of two primaries

Principles of Design

CONTRAST
UNITY
EMPHASIS
BALANCE PROPORTION/ SCALE
RHYTHM /REPETITION

Vocabulary Used in Art

Line
Shape
Contrast
Balance
Symmetrical
Asymmetrical
Repetition
Variety
Horizontal
Oblique
Diagonal
Perpendicular
Volume
Weight
Length
Area
Two-dimensional
Three-dimensional
Space
Ambiguous space
Positive
Negative
Foreground
Background
Middle ground
Scale
Proportion
Organic
Inorganic
Increments
Experiment
Discovery

Do any of these terms apply to other subjects studied? Could we bridge the gap between art and the core curriculum?

VIII. Recommended Sources for Art Prints

Crystal Productions, www.crystalproductions.com

Shorewood Fine Art Reproduction, 33 River Road, Cos Cob, Connecticut 06807 (1-800-492-3824)

National Gallery Of Art, Department of Education/ Extension Programs, www.nga.gov/resources/resource.htm

Davis Publications, www.davis-art.com

Appendix 1

LOUISIANA CONTENT STANDARDS
FOUNDATION SKILLS
Louisiana Department of Education

The Louisiana Content Standards Task Force developed the following foundation skills that should apply to all students in all disciplines.

1. Communication: A process by which information is exchanged and a concept of "meaning" is created and shared between individuals through a common system of symbols, signs, or behavior. Students should be able to communicate clearly, fluently, strategically, technologically, critically, and creatively in society and in a variety of workplaces. This process can best be accomplished through use of the following skills: reading, writing, speaking, listening, viewing, and visually representing.

2. Problem Solving: The identification of an obstacle or challenge and the subsequent application of knowledge and thinking processes, which include reasoning, decision making, and inquiry in order to reach a solution using multiple pathways, even when no routine path is apparent.

3. Resource Access and Utilization: The process of identifying, locating, selecting, and using resource tools to help in analyzing, synthesizing, and communicating information. The identification and employment of appropriate tools, techniques, and technologies are essential to all learning processes. These resource tools include pen, pencil, and paper; audio/video materials, word processors, computers, interactive devices, telecommunication, and other emerging technologies.

4. Linking and Generating Knowledge: The effective use of cognitive processes to generate and link knowledge across the disciplines and in a variety of contexts. In order to engage in the principles of continual improvement, students must be able to transfer and elaborate on these processes. Transfer refers to the ability to apply a strategy or content knowledge effectively in a setting or context other than that in which it was originally learned. Elaboration refers to monitoring, adjusting, and expanding strategies into other contexts.

5. Citizenship: The application of the understanding of the ideals, rights, and responsibilities of active participation in a democratic republic that includes working respectfully and productively together for the benefit of the individual and the community; being accountable for one's own choices and actions and understanding their impact on oneself and others; knowing one's civil, constitutional, and statutory rights; and mentoring others to become productive citizens and lifelong learners.

Note: These foundation skills are listed numerically in parentheses after each benchmark.

Appendix 2
Louisiana Arts Content Standards
State Standards for Curriculum Development
Bulletin 1963
Louisiana Department of Education

VISUAL ARTS

CREATIVE EXPRESSION

Standard: Students develop creative expression through the application of knowledge, ideas, communication skills, organizational abilities, and imagination.

GRADE CLUSTER	K–4	5–8	9–12
Benchmark 1	Explore and identify imagery from a variety of sources and create visual representations (2, 3)	Demonstrate art methods and techniques in visual representations based on research of imagery (2, 3)	Produce works of art that successfully convey a central theme based on imagery, ideas, feelings, and memories (1, 2, 3)
Benchmark 2	Explore and discuss techniques and technologies for visual expression and communication (1, 2, 3)	Select and apply media, techniques, and technology to visually express and communicate (1, 2, 3)	Apply a variety of media techniques, technologies, and processes for visual expression and communication (1, 2, 3)
Benchmark 3	Use art vocabulary and the elements and principles of design to convey the language of art (create and discuss own artwork) (1, 2, 3)	Use the elements and principles of design and art vocabulary to visually express and describe individual ideas (1, 2)	Use the elements and principles of design for individual expression while exploring compositional problems (1, 2)
Benchmark 4	Experiment to create various art forms, including art forms from other cultures (2, 3, 4)	Develop skills in creating various art forms, including art forms from other cultures (2, 3, 4)	Produce a visual representation of ideas derived through the study of various cultures and art forms (2, 3, 4)
Benchmark 5	Draw on imagination, individual experience, and group activities to generate ideas for visual expression (1, 4, 5)	Produce ideas for art productions while engaging in individual and group activities (1, 2, 5)	Produce imaginative works of art generated from individual and group ideas (1, 2, 5)

GRADE CLUSTER	K–4	5–8	9–12
Benchmark 6	Identify relationships among visual arts, other arts, and disciplines outside the arts (1, 4)	Understand and visually express relationships among visual arts, other arts, and disciplines outside the arts (1, 2, 4)	Produce works of art that describe and connect art with other disciplines (1, 2, 4)
Benchmark 7	Maintain a sketchbook or journal, or develop a portfolio (1, 2, 3)	Maintain a sketchbook or journal and develop a portfolio (1, 2, 3)	Maintain a sketchbook or journal and develop a portfolio (1, 2, 3)

VISUAL ARTS
AESTHETIC PERCEPTION

Standard: Students develop aesthetic perception through the knowledge of art forms and respect for their commonalities and differences.

GRADE CLUSTER	K–4	5–8	9–12
Benchmark 1	Use elements and principles of design and basic art vocabulary for expressing responses to the work of others (1, 4, 5)	Use elements and principles of design and expanded art vocabulary for responding to the aesthetic qualities of various works (1, 4)	Use advanced art/design vocabulary for responding to the aesthetic qualities of various works (1, 4)
Benchmark 2	Recognize and respond to concepts of beauty and taste in the ideas and creations of others through the study of visual arts (1, 4, 5)	Recognize that concepts of beauty differ by culture and that taste varies from person to person (1, 4, 5)	Distinguish unique characteristics of art as it reflects concepts of beauty and quality of life in various cultures (1, 4, 5)
Benchmark 3	Explore the beauty in nature and discern images and sensory qualities found in nature and art (1, 2)	Perceive the aesthetic value and influence of organic forms and the natural environment as reflected in works of art (1, 2, 4)	Use analogies, metaphors, and other descriptors to describe interrelationships in works of art and nature (1, 2, 4)
Benchmark 4	Recognize that there are many possibilities and choices in the processes for designing and producing visual arts (2, 3, 4)	Demonstrate awareness of various new ideas, possibilities, options, and situations pertaining to the art world (1, 4)	Compare and contrast multiple possibilities and options available for artistic expression (1, 4)
Benchmark 5	Participate in guided inquiry into the basic question “What is art?” and share personal feelings or preferences about various works (1, 2, 4)	Discuss the question “What is art?” and express intuitive reactions and personal responses to various works (1, 4)	Question/weigh evidence and information, examine intuitive reactions, and articulate personal attitudes toward visual work (1, 2, 5)
Benchmark 6	Identify where and how the visual arts are used in daily life and in the community (1, 2, 4)	Describe the use and value of the visual arts in daily life, the workplace, and the community (1, 2, 4)	Integrate knowledge of the visual arts in the total environment to understand the arts within a community (2, 4, 5)

VISUAL ARTS
HISTORICAL AND CULTURAL PERSPECTIVE

Standard: Students develop historical and cultural perspective by recognizing and understanding that the arts throughout history are a record of human experience with a past, present, and future.

GRADE CLUSTER	K–4	5–8	9–12
Benchmark 1	Identify the subject, basic style, and culture represented by various works of art (2, 4)	Identify and classify works of art by their subject, style, culture, and time period (2, 4)	Analyze specific styles and periods of art in relation to prevailing cultural, social, political, and economic conditions (2, 4, 5)
Benchmark 2	Recognize universal symbols and how works of art communicate a universal language (1, 4, 5)	Understand how works of art cross geographical, political, and historical boundaries (2, 4)	Analyze how works of art cross geographical, political, and historical boundaries (2, 4)
Benchmark 3	Identify art images and themes from the past and present and discuss historical differences (1, 2, 4)	Understand the meaning and significance of ideas, themes, and messages in works of art from the past and present (2, 4)	Compare and contrast ways art has been used to communicate ideas, themes, and messages throughout history (1, 2, 4)
Benchmark 4	Identify media used in works of art throughout history and recognize the importance of available resources (2, 3, 4)	Distinguish media and techniques used to create works of art throughout history (2, 3, 4)	Analyze materials, technologies, media, and processes of the visual arts throughout history (2, 3, 4)
Benchmark 5	Recognize professions in the visual arts and the role and status of the artist in various cultures and time periods (2, 4)	Describe and compare careers in visual arts and the role and status of the artist in various cultures and time periods (1, 2, 4)	Investigate and assess roles, careers, and career opportunities in the visual arts (2, 4)
Benchmark 6	Recognize great artists and works of art that have shaped the history of art (2, 4)	Identify major works of great and influential artists and recognize their achievements (4, 5)	Identify representative visual artists of various cultures and compare their lives, careers, works, and influence (1, 4)

VISUAL ARTS
CRITICAL ANALYSIS

Standard: Students make informed verbal and written observations about the arts by developing skills for critical analysis through the study of and exposure to the arts.

GRADE CLUSTER	K–4	5–8	9–12
Benchmark 1	View works of art and express observations about how the elements and principles of design are used in the works (1, 4)	View works of art and analyze how artists use design elements and principles to achieve an aesthetic effect (2, 3, 4)	Apply knowledge of design elements and principles to analyze, compare, or contrast the composition of various works of art (2, 4)
Benchmark 2	Identify images, colors, and other art elements that have specific meanings in cultural contexts (1, 4)	Analyze and interpret art images for their symbolic meaning, purpose, and value in place and time (2, 4)	Compare and contrast symbolism as used in works of visual art from different cultures and time periods (1, 4)
Benchmark 3	Express and explain aesthetic judgments about the created (built) environment (1, 2, 4)	Express and justify aesthetic judgments about the created (built) environment (1, 2, 4)	Critique the design of structures or areas in the created (built) environment based on aesthetic criteria (1, 2, 4)
Benchmark 4	Express and explain opinions about visual works of others using basic art vocabulary (1, 4)	Critique works of art using expanded art vocabulary (1, 4)	Critique works of art using advanced art vocabulary (1, 4)
Benchmark 5	Express interpretations about works of art and give supporting reasons (1, 4)	Develop interpretations about works of art and give supporting reasons (1, 4)	Develop and justify personal interpretations of works of art based on information from inside and outside the work (1, 2, 4)

Appendix 3

Louisiana Content Standards, Benchmarks, and Grade Level Expectations for Science, Bulletin 1962

Louisiana Department of Education

Life Sciences §1929. **(Recommended for Grade 10)**

7. Personal and Community Health
   a. GLE 37: Explain how fitness and health maintenance can result in a longer human life span (LS-H-G1).
   b. GLE 38: Discuss mechanisms of disease transmission and processes of infection (LS-H-G2) (LS-H-G4).
   c. GLE 39: Compare the functions of the basic components of the human immune system (LS-H-G3).
   d. GLE 40: Determine the relationship between vaccination and immunity (LS-H-G3).
   e. GLE 41: Describe causes, symptoms, treatments, and preventions of major communicable and noncommunicable diseases (LS-H-G4).
   f. GLE 42: Summarize the uses of selected technological developments related to the prevention, diagnosis, and treatment of diseases or disorders (LS-H-G5).

NOTE: The foundation skills addressed by each benchmark are listed numerically in parenthesis after the benchmark.

§1301. Life Science

A. Focus. As investigations of the living environment are conducted, the rationales are set to establish further observations, measurements, and classifications of the various life forms. Patterns of similarities and differences within the diversity of life establish the basis for understanding the special relationships among living things in ecosystems.

B. Standard. The students will become aware of the characteristics and life cycles of organisms and understand their relationships to each other and to their environment.

AUTHORITY NOTE: Promulgated in accordance with R.S. 17.6; R.S. 17:24.4; R.S. 17:154. HISTORICAL NOTE: Promulgated by the Board of Elementary and Secondary Education, LR 31:2775 (November 2005).

4. interdependence of organisms, which includes:
   a. LS-H-D1: illustrating the biogeochemical cycles and explaining their importance (1, 2, 3, 4, 5);
   b. LS-H-D2: describing trophic levels and energy flows (1, 3, 4, 5);
   c. LS-H-D3: investigating population dynamics (2, 3, 4, 5);
   d. LS-H-D4: exploring how humans have impacted ecosystems and the need for societies to plan for the future (1, 2, 4, 5);
5. matter, energy, and organization of living systems:
   a. LS-H-E1: comparing and contrasting photosynthesis and cellular respiration; emphasizing their relationships (1, 2, 3, 4);
   b. LS-H-E2: recognizing the importance of the ATP cycle in energy usage within the cell (1, 2, 3, 4);
   c. LS-H-E3: differentiating among levels of biological organization (1, 4);
6. systems and the behavior of organisms:
   a. LS-H-F1: identifying the structure and functions of organ systems (1, 3, 4);
   b. LS-H-F2: identifying mechanisms involved in homeostasis (1, 3, 4);
   c. LS-H-F3: recognizing that behavior is the response of an organism to internal changes and/or external stimuli (1, 3, 4);
   d. LS-H-F4: recognizing that behavior patterns have adaptive value (3, 4);

NOTE: The foundation skills addressed by each benchmark are listed numerically in parenthesis after the benchmark.

AUTHORITY NOTE: Promulgated in accordance with R.S. 17.6; R.S. 17:24.4; R.S. 17:154. HISTORICAL NOTE: Promulgated by the Board of Elementary and Secondary Education, LR 31:2776 (November 2005).

§1701. Science and the Environment

A. Focus. Environmental education is a process aimed at the development of a literate citizenry which is aware of and shows concern for the total environment and its associated problems. This goal will be met by developing the knowledge, attitudes, motivation, commitment, and skills to work individually and collectively toward the solutions of current problems and the prevention of new ones.

B. Standard. In learning environmental science, students will develop an appreciation of the natural environment, learn the importance of environmental quality, and acquire a sense of stewardship. As consumers and citizens, they will be able to recognize how our personal, professional, and political actions affect the natural world.

AUTHORITY NOTE: Promulgated in accordance with R.S. 17.6; R.S. 17:24.4; R.S. 17:154. HISTORICAL NOTE: Promulgated by the Board of Elementary and Secondary Education, LR 31:2778 (November 2005).

§1707. Benchmarks 9-12

A. As students in Grades 9-12 extend their knowledge, what they know and are able to do includes:

1. ecological systems and interactions, which include:
    a. SE-H-A1: demonstrating an understanding of the functions of earth's major ecological systems (1, 2, 3, 4);
    b. SE-H-A2: investigating the flow of energy in ecological systems (1, 2, 3, 4);
    c. SE-H-A3: describing how habitat, carrying capacity, and limiting factors influence plant and animal populations (including humans) (1, 3, 4, 5);
    d. SE-H-A4: understanding that change is a fundamental characteristic of every ecosystem and that ecosystems have varying capacities for change and recovery (1, 2, 3, 4, 5);
    e. SE-H-A5: describing the dynamic interactions between divisions of the biosphere (1, 3, 4);
    f. SE-H-A6: describing and explaining the earth's biochemical and geochemical cycles and their relationship to ecosystem stability (1, 2, 4);
    g. SE-H-A7: comparing and contrasting the dynamic interaction within the biosphere (1, 2, 4);
    h. SE-H-A8: analyzing evidence that plant and animal species have evolved physical, biochemical, and/or behavioral adaptations to their environments (1, 2, 3, 4, 5);
    i. SE-H-A9: demonstrating an understanding of influencing factors of biodiversity (1, 3, 4, 5);
    j. SE-H-A10: explaining that all species represent a vital link in a complex web of interaction (1, 3, 4, 5);
    k. SE-H-A11: understanding how pollutants can affect living systems (1, 2, 3, 4, 5);
2. resources and resource management, which include:
    a. SE-H-B1: explaining the relationships between renewable and nonrenewable resources (1, 3, 4);
    b. SE-H-B2: comparing and contrasting conserving and preserving resources (1, 3, 4);
    c. SE-H-B3: recognizing that population size and geographic and economic factors result in the inequitable distribution of the earth's resources (1, 2, 3, 4, 5);
    d. SE-H-B4: comparing and contrasting long and short-term consequences of resource management (1, 2, 3, 4, 5);
    e. SE-H-B5: analyzing resource management (1, 2, 3, 4, 5);
    f. SE-H-B6: recognizing that sustainable development is a process of change in which resource use, investment direction, technological development, and institutional change meet society's present as well as future needs (1, 2, 3, 4, 5);
3. environmental awareness and protection:
    a. SE-H-C1: evaluating the dynamic interaction of land, water, and air and its relationship to living things in maintaining a healthy environment (1, 2, 3, 4, 5);
    b. SE-H-C2: evaluating the relationships between quality of life and environmental quality (1, 2, 3, 4, 5);
    c. SE-H-C3: investigating and communicating how environmental policy is formed by the interaction of social, economic, technological, and political considerations (1, 2, 3, 4, 5);
    d. SE-H-C4: demonstrating that environmental decisions include analyses that incorporate ecological, health, social, and economic factors (1, 2, 3, 4, 5);

e. SE-H-C5: analyzing how public support affects the creation and enforcement of environmental laws and regulations (1, 2, 3, 4, 5);

4. personal choices and responsible actions:
   a. SE-H-D1: demonstrating the effects of personal choices and actions on the natural environment (1, 2, 3, 4, 5);
   b. SE-H-D2: analyzing how individuals are capable of reducing and reversing their impact on the environment through thinking, planning, education, collaboration, and action (1, 2, 3, 4, 5);
   c. SE-H-D3: demonstrating that the most important factor in prevention and control of pollution is education (1, 2, 3, 4, 5);
   d. SE-H-D4: demonstrating a knowledge that environmental issues should be a local and global concern (1, 2, 3, 4, 5);
   e. SE-H-D5: recognizing that the development of accountability toward the environment is essential for sustainability (1, 2, 3, 4, 5);
   f. SE-H-D6: developing an awareness of personal responsibility as stewards of the local and global environment (1, 2, 3, 4, 5).

NOTE: The foundation skills addressed by each benchmark are listed numerically in parenthesis after the benchmark.

AUTHORITY NOTE: Promulgated in accordance with R.S. 17.6; R.S. 17:24.4; R.S. 17:154. HISTORICAL NOTE: Promulgated by the Board of Elementary and Secondary Education, LR 31:2779 (November 2005).

MATH

§701. Measurement

A. Focus. Measurement is the connection between numbers and the real word and as such is a vital component of an attempt to organize the world. It allows one to communicate effectively and make decisions. It relates geometry and algebra, as well as geometry and numbers, in both intuitive and formal ways. It is also a connecting theme between such diverse fields as athletics, music, travel, astronomy, and engineering. The study of measurement should consist of active investigations based on real-world problems in both individual and group format. These explorations should include the appropriate use of manipulatives and technology and should encourage the development of communications, reasoning, and problemsolving skills. Students need to learn the effect of unit choice on mathematical entities, such as the shape of graphs and the magnitude of answers. Secondary students should become so adept with the use of units that they are comfortable with the use of compound units (foot-pounds, miles per second) and specialized units (atmospheres, millennia, gigabytes) as they occur in real-world problems.

B. Standard. In problem-solving investigations, students demonstrate an understanding of the concepts, processes, and real-life applications of measurement.

AUTHORITY NOTE: Promulgated in accordance with R.S. 17.6; R.S. 17:24.4; R.S. 17:154. HISTORICAL NOTE: Promulgated by the Board of Elementary and Secondary Education, LR 31:2841 (November 2005).

§707. Benchmarks 9-12

A. Students in Grades 9-12 use number sense, estimation, appropriate manipulatives, tools, and technology as they extend their investigations of problems involving measurement. As a result, what they know and are able to do includes:

1. M-1-H: Selecting and using appropriate units, techniques, and tools to measure quantities in order to achieve specified degrees of precision, accuracy, and error (or tolerance) of measurements (3);
2. M-2-H: Demonstrating an intuitive sense of measurement (e.g., estimating and determining reasonableness of results as related to area, volume, mass, rate, and distance) (1, 2, 4);
3. M-3-H: Estimating, computing, and applying physical measurement using suitable units (e.g., calculate of solids presented in real-world situations) (1, 3, 4);
4. M-4-H: Demonstrating the concept of measurement as it applied to real-world experiences (1, 2, 3, 4, 5). NOTE: The foundation skills addressed by each benchmark are listed numerically in parentheses after the benchmark.

AUTHORITY NOTE: Promulgated in accordance with R.S. 17.6; R.S. 17:24.4; R.S. 17:154. HISTORICAL NOTE: Promulgated by the Board of Elementary and Secondary Education, LR 31:2842 (November 2005)

Geometry

§901. Geometry

A. Focus. Geometry is the study of the physical shapes of the word in which we live. It provides a natural environment for the use of inductive and deductive reasoning. It is not only basic to design, construction, and engineering, but also to law, medicine, and other fields that depend on critical deductive thinking skills. It provides models for representing many numerical and algebraic concepts. In Grades K-4, students must have opportunities to examine, manipulate, and construct geometric models using concrete materials. These activities should take place in a setting where students may freely explore and discuss ideas in order to develop and use appropriate vocabulary. After such first-hand experiences, many students should be able to progress to pictorial and abstract representations. The study of geometry should center around cooperative group investigations designed to promote the discovery of geometric concepts and principles and should encourage the development of communication, reasoning, and problemsolving skills. Secondary students should develop coordinate and transformational geometry as well as the usual axiomatic geometry. They should develop deductive reasoning skills by way of written proofs in a variety of formats. In the study of geometry, students should have access to appropriate manipulatives, technology, and construction materials to enhance their investigations.

B. Standard. In problem-solving investigations, students demonstrate an understanding of geometric concepts and applications involving one-, two-, and three-dimensional geometry, and justify their findings.

NOTE: The foundation skills addressed by each benchmark are listed numerically in parentheses after the benchmark.

AUTHORITY NOTE: Promulgated in accordance with R.S. 17.6; R.S. 17:24.4; R.S. 17:154. HISTORICAL NOTE: Promulgated by the Board of Elementary and Secondary Education, LR 31:2842 (November 2005).

§903. Benchmark

1. G-1-E: Determining the relationships among shapes (1, 2, 3, 4);
2. G-2-E: Identifying, describing, comparing, constructing, and classifying two-dimensional and threedimensional geometric shapes using a variety of materials (1, 2, 3, 4);
3. G-3-E: Making predictions regarding combinations, subdivisions, and transformations (slides, flips, turns) of simple plane geometric shapes (1, 2, 4);
4. G-4-E: Drawing, constructing models, and comparing geometric shapes, with special attention to developing spatial sense (1, 2, 4);
5. G-5-E: Identifying and drawing line and angles and describing their relationships to each other and to the real world (1, 4, 5);
6. G-6-E: Demonstrating the connection of geometry to the other strands and to real-lie situations (1, 2, 3, 4, 5). NOTE: The foundation skills addressed by each benchmark are listed numerically in parentheses after the benchmark.

AUTHORITY NOTE: Promulgated in accordance with R.S. 17.6; R.S. 17:24.4; R.S. 17:154. HISTORICAL NOTE: Promulgated by the Board of Elementary and Secondary Education, LR 31:2843 (November 2005).

§907. Benchmarks 9-12 A. Students in Grades 9-12 use number sense, estimation, models, drawings, manipulatives, and technology as they extend their investigations of problems involving geometric concepts. As a result, what they know and are able to do includes:

1. G-1-H: Identifying, describing, comparing, constructing, and classifying geometric figures in two and three dimensions using technology where appropriate to explore and make conjectures about geometric concepts and figures (1, 2, 3, 4);
2. G-2-H: Representing and solving problems using geometric models and the properties of those models (e.g., Pythagorean Theorem or formulas involving radium, diameter, and circumference) (1, 2, 3);
3. G-3-H: Solving problems using coordinate methods, as well as synthetic and transformational methods (e.g., transform on a coordinate plane a design found in reallife situations) (2);
4. G-4-H: Using inductive reasoning to predict, discover, and apply geometric properties and relationships (e.g., patty paper constructions, sum of the angles in a polygon) (1, 2, 4);
5. G-5-H: Classifying figures in terms of congruence and similarity and applying these relationships (4);
6. G-6-H: Demonstrating deductive reasoning and mathematical justification (e.g., oral explanation, informal proof, and paragraph proof) (1, 2, 4).