Theme: Containment/Protection

Lesson Title: Egg in Flight

Grade Level: 5-8
Time: 4 weeks

Art Concept: Nature inspired package design
Artmaking Processes and Techniques: Drawing and Construction
Art Elements/Principles of Design: Line, shape, space, volume, balance, proportion

National Standards: 1a, b, 2a, b, 4a,b, c, 5a, (5c) and 6b
State Goals, Learning Standards and Benchmarks: (Middle level)

ART: 26.B.3d (3d & functional), 27.A, 3a (package design)
(The unit could also involve 27.B.3 if students discuss package design from other cultures).

SCIENCE:
11.B.3a-f

Disciplines: AP, AH, AC, AE

Domains: C4, C5, C6

Overview: Students will engage in research on package design looking for ways to protect contents as well as developing aesthetically pleasing designs. Drawings will be made from natural and manmade sources. Package designs will be designed, built, and tested to ascertain their ability to protect an egg from a 4 story fall.

Rationale: Observing nature can be an inspiration for forms both aesthetic and functional. Velcro and aerodynamic designs for airplanes and automobiles came from observations of natural forms. The form of a functional design can also be aesthetic and expressive which allows for ownership of the individual encouraging commitment to the project and deepening an understanding of self. Engaging in problem solving can be challenging and rewarding; therefore, leading to self-satisfaction and increasing self-esteem.
Objectives

As a result of this unit, students will

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<td>Make at least two carefully observed renderings based on research of at least two packing designs for both natural and constructed forms (four drawings). <strong>26.B.3d, 2b, (C3)</strong></td>
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<td>Draw at least two designs based on research of eggs, egg containers and other natural and constructed “packages” to analyze structure. <strong>26.B.3d, 2b, (C4)</strong></td>
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<td>Develop a series of at least four designs to package and protect an egg from a three story drop using their choice of materials. <strong>26.B.3d, 2c, (C5)</strong></td>
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<td>Construct at least one structure not to exceed 6” in any direction, to cradle or protect an egg that integrates the personality of the designer and the function of the structure. <strong>26.B.3d, 2c, (C5)</strong></td>
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<td>Using library and electronic resources, find at least two package designs for both natural and constructed forms from both the past and present and compare their identifying characteristics. <strong>27.A.2b, 4a</strong></td>
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<td>Analyze orally and in writing, package designs of various cultures and times in terms of available technology, function, and expression of the culture. <strong>27.A.3b, 27.B.3, 4c, (C4)</strong></td>
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<td>Identify from a group of images, the work of Renaissance artists Michelangelo and daVinci. <strong>27.B.3, 4b (C2)</strong></td>
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<td>Identify three philosophies of the Renaissance as Humanism, Individualism, and Scientific Naturalism. <strong>27.B3., 4c, (C4)</strong></td>
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<td>Identify, from a group of still life images, the paintings of the tromp l’oeil artists of the Dutch Baroque. <strong>27.B.3, 4b (C2)</strong></td>
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<td>In two written paragraphs compare and contrast a work that focuses on a naturalist approach with one work that focuses on a scientific approach in terms of form and content. <strong>25.B.3, 3b, 4c. (C4)</strong></td>
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<th>Aesthetics</th>
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<td>Determine in an oral discussion whether utilitarian objects such as packages, cups, glasses could be considered art. <strong>27.B.3, 4a, 4b, (C4)</strong></td>
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<tr>
<td>Determine in writing whether there should be a hierarchy of art objects giving at least one reason. <strong>27.A.3b, 5a</strong></td>
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<tr>
<td>In writing, construct a definition that might allow some objects to be considered art and others not. <strong>27.B.3, 4a, 4b, (C5)</strong></td>
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<td>Using library and electronic resources, find at least two studies of plants that cradle or protect an inside object and compare their identifying characteristics. <strong>11.B.3b (C4)</strong></td>
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<td>Analyze orally and in writing the success or failure of their own and classmates designs and determine what worked in terms of function and what did not work offering possible suggestions for improvement. <strong>11.B.3d, 11.B.3e, 2b (C6)</strong></td>
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**Participation:** demonstrate a willingness to learn about other cultures by positively contributing to the discussion at least twice during the lesson. (A1)
Vocabulary

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<tr>
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<th>Science Terms</th>
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<tr>
<td><strong>Form &amp; Function</strong> The relationship between the three-dimensional shape of an object and its purpose.</td>
<td><strong>Cradle</strong> A frame used to support something.</td>
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<tr>
<td><strong>Functional Design</strong> The plan for the structure and look of an object which will serve a useful purpose.</td>
<td><strong>Gravity</strong> The force related to mass that causes objects to fall toward that mass.</td>
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<td><strong>Geometric</strong> Regular or mathematically derived shapes or forms.</td>
<td><strong>Impact</strong> The striking of one body against another; a collision.</td>
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<tr>
<td><strong>Organic</strong> Having an irregular or free form shape. A shape derived from living organisms.</td>
<td><strong>Inertia</strong> The tendency of a body at rest to remain at rest and a body in motion to remain in motion.</td>
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<tr>
<td><strong>Cradle</strong> A frame used to support something.</td>
<td><strong>Insulate</strong> To detach; isolate.</td>
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<tr>
<td><strong>Gravity</strong> The force related to mass that causes objects to fall toward that mass.</td>
<td><strong>Lift</strong> The component of the total aerodynamic force acting on an airfoil, or on an entire aircraft or winged missile, perpendicular to the relative wind and normally exerted in an upward direction, opposed to the pull of gravity.</td>
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Motivation: Many examples of package design will be on display. Examples of student designs based on natural forms will be presented along with a PowerPoint presentation. After egg containers are completed they will be taken to the top of the parking garage and dropped off (2 video cameras one high & one low would be nice for documentation and later analysis).

Student Pre-requisite: Some experience with drawing from observation

Instructional Methods: Posters, artifacts, slides will be shown and discussed. Various packages will be presented. Students will be asked to debate the nature of art especially in functional works (what other examples of functional art can they name?). Hands on student involvement. Group discussion. Project trial and critique.

Learning Activities

Procedure (Teacher Directed)
1. Set Induction: Ask students what they know about package design.
2. Roll egg on table and discuss the design of an egg. Drop egg on floor (protected by paper and plastic). Ask if it was possible to prevent the egg from breaking?
3. Debate aesthetics N. & Adj. in relation to utilitarian objects.
4. Show package design from different cultures & times, Baskets, Boxes, Chests, Pottery, etc.
5. Discuss function and the form of the objects.
6. Look at containers from different cultures
7. Have students consider natural packaging: seed pods & other seed containers like peaches, tomatoes, pomegranate, and peas.
8. Look at packaging containers such as electronics components, egg cartons etc.

Artmaking
Materials: Paper, pencils, fruit & vegetables, craft sticks, rubber bands, cardboard, tempera paint, found objects.

Procedure:

(Teacher Directed):
1. Show examples of daVinci's studies of nature and machine designs
2. Describe how he used drawing to carefully study nature and then incorporated the ideas he discovered from careful scrutiny of nature to his machine designs.
3. Show examples of Design lessons from nature.
4. Hand out fruit and vegetables for students to draw from careful observation allowing about 20 min.
5. Cut fruit and vegetables in half for them to observe how the seeds are cradled, protected and nourished within the fruit and vegetables.

(Guided Practice) Students will:
Make drawings for natural seed holders as proposed package designs similar to daVinci's drawings that dissect natural objects & some of his proposed engineering projects.

(Independent Practice) Students will:
Conduct library research on package design (natural and constructed) using library and electronic sources

(Guided Practice) Students will:
1. Make drawings for man-made package designs they have found from their research to cradle "seeds".

Procedure
(Teacher Directed):
Describe egg package project

(Guided Practice) Students will:
2. After describing egg package project make four drawings as proposals for package construction including exterior decorations.
3. Construct package complete with decorations.
4. After constructions are complete, teacher will lead students to parking garage where they will - - one at a time-- test the effectiveness of their design.
5. Write an analysis of the success or failure of the container suggesting the strengths and weaknesses of the design along with possible modifications to improve the structure.

(Closure)
1. Ask students what they learned about structure in package design.
2. Ask students whether they can recall any of the aesthetic philosophies and discuss the place for functional objects in fine arts.
3. Ask students what they learned about research.
**Assessment of Student Learning**

*Did each student:*

**Artmaking**

- **Checklist:**
  - make at least two carefully observed renderings based on research of at least two packing designs for both natural and constructed forms (four drawings)?
  - draw at least two designs based on research of eggs, egg containers and other natural and constructed “packages” to analyze structure?
  - develop a series of at least four designs to package and protect an egg from a three-story drop using their choice of materials?

- **Rubric:**
  - construct at least one structure not to exceed 6” in any direction, to cradle or protect an egg that integrates the personality of the designer and the function of the structure?

**Historical/Cultural**

- **Checklist:**
  - use library and electronic resources to find at least two package designs for both natural and constructed forms from both the past and present and compare their identifying characteristics?

- **Written:**
  - analyze orally and in writing, package designs of various cultures and times in terms of available technology, function, and expression of the culture?
  - identify from a group of images, the work of Renaissance artists Michelangelo and da Vinci
  - identify three philosophies of the Renaissance as Humanism, Individualism, and Scientific Naturalism.
  - identify, from a group of still life images, the paintings of the tromp l’oeil artists of the Dutch.

**Criticism**

- **Written & Checklist:**
  - analyze orally and in writing the success or failure of their own and classmates designs and determine what worked in terms of form and function and what did not work offering possible suggestions for improvement?

- **Written:**
  - compare and contrast in writing, works that focus on a naturalist or scientific approach from a Renaissance artist and an artist from the Dutch Baroque in terms of form and content?

**Aesthetics**

- **Checklist:**
  - determine in an oral discussion whether utilitarian objects, packages, cups, glasses could be considered art. Are some art and others not?

- **Written**
  - determine in writing whether they believe there is/is not or should or should not be a hierarchy of art objects giving at least one reason for their assertion?

- **Written:**
  - construct a definition in writing that might allow some objects to be considered art and others not?

**Science**

- **Use the library and electronic resources to find at least two studies of plants that cradle or protect an inside object and compare their identifying characteristics**

- **Analyze orally and in writing the success or failure of their own and classmates designs and determine what worked in terms of function and what did not work and offer possible suggestions for improvement.**

**Participation:** Teacher Observation and Checklist
References


*Developed and written by Dr. Edward O. Stewart, Illinois State University, 2002*