

9

Holdenville Education Foundation, Inc.
PO Box 641 · Holdenville, OK 74848
info@hef4ourkids.com

Grants to Teachers Application
Cover Page

Date: 2-11-07
Grant Title: Anatomy in Clay
School: Holdenville Junior/Senior High
Grade Level: 7-12
Content Area: Anatomy and Physiology; Biology I and II; Health; Art; Middle School
General Science
Total Dollar Amount Requested: \$5,381.59 *funded*

Lorene Perkins

Signature of Grant Applicant

Donna Pitts

Signature of building principal

Holdenville Education Foundation
PO Box 641
Holdenville, OK 74848
Attn: Teacher Grants Committee

Holdenville Education Foundation, Inc.
PO Box 641 · Holdenville, OK 74848
info@hef4ourkids.com

Overview

The objective of this project is to enhance student learning through a hands-on body system building activity. This provides the students several different ways to grasp concepts of anatomy. Students are taught lessons through lecture, discussion, review, and these hands-on activities. This targets different students learning styles and enables ALL students to be successful in the class.

Maniken is a three-dimensional learning system, combining the traditional teaching mode with the act of forming clay anatomy and positioning it on a precise, specially-made skeletal model. Building muscles in clay reveals their logic, form, and function and assists the students to retain the knowledge their hands have learned.

Maniken is a three-dimensional tool which can be manipulated to study each of the body systems. Systems can be added or removed repeatedly, as one clay rendering is laid atop another so students can see how the systems are intertwined and function together. Orienting the students to the correct anatomical terminology is also enhanced when they have this model to work with. The model and the students' own bodies are oriented in the same way, allowing them to explore and understand anatomy by tapping into their own kinesthetic intelligence. Students are learning functional anatomy in a manner that no printed or projected image could accomplish.

By watching students continually work with the clay and models, immediate teacher intervention is possible for correction and support of their knowledge of human anatomy. There is no lag time between lessons taught and testing for understanding. This increase in the constructive use of student/teacher time also increases the likelihood that students will achieve academic success through this learning model. Hopefully, the knowledge gained from this method of learning anatomy will foster lifelong healthy habits in these future adults.

Holdenville Education Foundation, Inc.
 PO Box 641 · Holdenville, OK 74848
info@hef4ourkids.com

Grants to Teachers Application Form

Date: 2-11-07

Grant Title: Anatomy in Clay

School: Holdenville Junior/Senior High

Grade Level: 7-12

Content Area: Anatomy and Physiology; Biology I and II; Health; Art; Middle School General Science

Total Dollar Amount Requested: \$5,381.59

- What is the major educational need this grant addresses?** It is difficult to teach abstract concepts as most students think in concrete terms. Using hands-on activities improves their comprehension. Special education students should learn and internalize the curriculum better when the lesson involves something kinesthetic. Hopefully, the anatomy in clay curriculum will help to improve our students scores on the state mandated Biology I end of instruction (EOI) tests and the ACT scores for college entrance.

Year	% of HHS students with satisfactory or advanced on Biology I EOI	Local ACT scores	State ACT scores	National ACT scores
2003	27%	19.4	20.5	20.8
2004	27%	19.7	20.6	20.9
2005	25%	19.3	20.4	20.9
2006	35%	18.8	20.4	20.9

The materials can be used for simple concepts in biology or general science to in-depth studies of form and function in anatomy and physiology. They can be used by art students to study the human form. A set of Manikens can be used in collaborative groups to show the interface of form and function as one of the universal expressions of nature. According to state regulations, science students must conduct labs using critical thinking and problem solving skills.

- How many pupils will be affected by this project, both directly and indirectly?** The Manikens can be used in a single day for one lesson or multi-day segments by a large number of science and art students (400 students in a year). The anatomy and physiology students would also teach a one day basic anatomy class to the sixth grade—both to impart information to the elementary students and to pique their interest in upper level science. The upper level students imparting the lesson would better internalize the information they are being asked to teach. The Manikens and the clay are a non-consumable product that can be used for many years. The clay is non-drying and should last for many years. If additional clay is needed, it would be a small expense that the school would be willing to provide.

3. **Describe your grant methods, materials, and objectives.** The Manikens can be used to fulfill the following Oklahoma PASS objectives in science (Sample activities are listed after each objective. The activities listed are representative and are **not** inclusive of all the possible uses for the Maniken.):

- Process standard one – observing and measuring
Students must build a nerve network which would be appropriately proportioned to the Maniken size.
- Process standard two – classify
Muscles will be identified according to action, tissue type, and location .
- Process standard four –interpreting and communicating
Students will be assigned different muscles; they will read about their muscles’ origin, insertion, and action; build the muscle; and present their model to their classmates.
- Process standard five – modeling
All activities using the manikin clay are modeling activities.
- Content standard one – the cell
Cell organelles can be constructed using the modeling clay.

The Manikens can also be used in the art classroom as art and science have common characteristics:

- Both disciplines are based on observation, experimentation, and traditional models.
- Both disciplines recognize that problem solving requires a willingness to come up with and reexamine theory.
- Both disciplines encourage reflection, assessment, and openness to change.
- Both disciplines respect historical tradition.
- Both are creative in approach.
- Art conveys a product, idea, or message. Science conveys results, inferences, and implications.

This classroom package listed below will accommodate a class of up to 20 students and includes a model for the instructor.

Item 1, the Maniken Student 1, is the plastic skeletal model on which the other body systems will be built. Jon Zahourek, the founder of Zahourek Systems Inc. and the developer of Anatomy in Clay is an artist, sculptor and student of anatomy who wanted to create a system for learning anatomy that went beyond two dimensional representations of muscles. He also wanted to illuminate the functional relationships between the muscles. To this end he built a specially designed model skeleton and began to build the muscles on it in clay. The system has been used as part of the anatomy curriculum at the junior high, high school and college level. Preliminary studies show that students who use this system retain more of the information than students taught in a more traditional way.

Item 2, the basic tool set, is the set of tools for shaping and cutting the clay.

Item 3, the badabingbadaboom, is the stand for the manikin. (Zahourek gave the stand an unfortunate name!)

Item 4, the clay gun extruder, is used to make thin ropes of clay to model arteries, veins, and nerves.

Item 5, the PVC clay gun handle, is used with the extruder to make the ropes easier to form. It can also be used as a rolling pin to make flat layers of clay as might be used for a pectoral muscle.

Item 6, the Starla on MANIKEN, is a curriculum developed for use with the Manikens by Starla A. Ewan, M.S.

Item 7, 5 volume atlas set, is a set of books that is a cross-reference and support for the Maniken users. They have photos and illustrations of muscles and other organs made onto Manikens. Every muscle, except for those found in the middle ear, is given a full, two page spread. They are shown from deep to superficial to illustrate the organization of human musculature. Latin and Greek derivations are given as well as insertion, origin, and muscle action.

4. **Time Schedule: The Manikens will be utilized immediately upon receipt.**
 Lower level science courses will use the models for a simple, one day to two week lessons. They will make models of the organs of the body, with emphasis on one or more of the following affects their bodies: injuries, aging, surgeries, and alcohol/drug use. Upper level biology courses will use the models for a nine weeks period when studying the body. Anatomy and physiology would utilize the models for the better part of the school year, with a memorial service for each student's model when it must be broken down into its components for use by the next year's students. Art classes will use the models for short or long term lessons when studying human anatomy.

5. **Detailed budget request:**

ITEM	QUANTITY	RATE	TOTAL
MANIKEN Student 1	11	349.00	3839.00
Basic Tool Set	10	9.95	99.50
Bababingbadaboom	10	29.95	299.95
Clay gun extruder	3	9.49	28.47
PVC Clay gun handle	3	3.50	10.50
Starla on MANIKEN	1	349.00	349.00
5 Volume atlas set	3	99.95	299.85
Subtotal			5125.32
Shipping			256.27
Total			5,381.59

6. Evaluation:

Students will be evaluated in several different areas to test for learned concepts. To measure student successes, students will be given written evaluations that follow the lesson plans for muscle, nerve, and blood vessel building. In addition, upper level students will be given writing assignments (2-3 page research papers) on related topics for each system. Student scores in class and on standardized tests (ACT and PASS) will be used to gauge the success of this program. Improved student attendance, enrollment in upper level science, and enthusiasm can also be used to determine the success of this program.









