The Organ Entrails Research Project

Summary
This a high interest inquiry/research project for students. The student groups will become expert on one organ system.

Main Core Tie
Science - Biology
Standard 3 Objective 1

Additional Core Ties
Science - Biology
Standard 3 Objective 2

Time Frame
10 class periods of 60 minutes each

Group Size
Small Groups

Materials
- Dissection Plans and Observations sheet
  (attached)
- Microscopic Observations sheet
  (attached)
- Student sheet
  (attached)
- Rubric
  (attached)
computers with Internet access and a PowerPoint program
Biology text books and any other pertinent books from the library
dissecting kits
dissecting trays
fetal pigs
tulips or other flowering plant
paper towels
slides
coverslips
prepared tissue slides
iodine
bromethymol blue
masking tape
permanent markers
paper
television
microscope camer
microscopes
Background for Teachers

**Description:**
This is a high interest inquiry/research project for students. The student groups will become expert on one organ system. With their group they will dissect a fetal pig and a flowering plant. Students will design their own dissections (including plans) and generate a 10-15 minute presentation for the class. The activity is written as a Power Point presentation but students could do this as a class report without using computers. The students will make a handout for the class and take a test covering other class member presentations. A comparison of the function and structure of organs in different organisms should be emphasized.

**Background Information:**
Students probably have had little experience dissecting but should have previous knowledge about organ systems. They will have much more difficulty with the plant systems because students often barely consider plants to be alive, much less functioning with systems similar to those of animals. Plan on discussing plants in some detail as living things with systems before you begin the activities.

**Safety Issues:**
Be sensitive to students who have issues (moral/health/emotional etc) to dissecting. Students should not be forced to dissect or watch a dissection. Work out a plan ahead of time for the students who wish to avoid the dissection such as work in the library or computer lab. These students can still provide essential contributions to this project through research, presentation development, or making posters. Make sure students wash their hands after dealing with any specimens. Students should always use care when dealing with scissors and scalpels. Care should also be used when dealing with expensive equipment including cameras, laptops, microscopes etc. Students should be familiar with safety rules for your classroom. Additional safety information can be found on the Utah State Science Homepage.

**Formative Feedback Guide:**
The following chart describes the ideal assessment process for improving student performance:

**Duration:**
2 weeks. Approximate breakdown:
- introduction of project-50 minutes
- computer lab and dissection plans 150 minutes
- dissections and tissue viewing with microscope-100 minutes
- presentation preparation-100 minutes
- class presentations-100 minutes
- multiple choice assessment-30 minutes
- some students may need to spend time at home to complete the task

**Student Prior Knowledge**
Students should know how to make a wet mount slide and use a microscope. One student per group should have multimedia experience including PowerPoint, digital camera skills etc. Students need some prior knowledge of organ systems and tissues, however, this is formative assessment and students will direct much of their own learning.
Instructional Procedures

1. Teacher preparation:
   Obtain all supplies. Fetal pigs can be ordered from a biological supply company. The flowers should be obtained the day of the dissection or the night before.
   hotocopy project sheets and rubrics for students.

Introduction:
Allow students to read through the requirements and look over the grading rubric. Emphasize that the rubric is the guide to their PowerPoint presentation. A slide (or two) in the presentation should address each section of the rubric. Check-off boxes are provided on the rubric to help students keep track of their progress.

Go over the requirements/rubric with the students. Answer any questions the students may have about the project requirements, deadlines or grading. Fill in the points you wish each part to have before you give to students.

Allow students to choose groups of 3-4 students or assign groups.

Each group should choose a first and a second choice for an organ system and write them on a piece of paper. You will probably want to have students look in their books for a brief overview of each system so that they can make an educated decision. Ask them to also write down why they wish to have their particular system to aid you in assigning groups. The core lists the following systems as requirements for study: Skeletal System, Muscular System, Digestive System, Circulatory System, Respiratory System, Nervous System. Other systems (Endocrine, Excretory, Reproductive, Integumentary) can be included if you wish. Write the names of the systems on the board for students to choose from.

After the students have left class determine the organ systems each group receives.

Dissection Plan
Announce student group organ systems. Explain that any information they find on the system needs to have the source documented for the bibliography.

Have students create a dissection plan for the pig and the plant. They will have one day in the computer lab to design their dissections and create their plans. (There are many sites on the Internet that have virtual fetal pig dissections. Students should easily find information on how to dissect their pig and their plant.)

Make sure all plans have your approval before dissection begins. Students should have clear simple procedures for the dissection. The diagrams should be accurate enough to help them when they begin dissecting.

Explain to students they do not all need to dissect. Allow non-dissecting students to work out of the classroom on the PowerPoint presentation or in the classroom if they are comfortable there.

Encourage students to bring digital cameras and take pictures of their dissections. The pictures can be inserted into their PowerPoint presentations. If cameras are not available, drawings can be made or pictures can be downloaded from the Internet.

It is important during the workdays that you monitor individual students effort and overall group progress. You may want to print a class list and keep track of progress daily.

Microscopic Observations
Students should make microscope slides of tissues as they dissect. The iodine and Bromthymol blue can be used to stain tissue. Have commercially prepared tissue slides available for students who have difficulty making clear slides. Many tissues are very difficult to make clear preparations of.

Students should make drawings of what they see for transfer to their posters at a later time.

Presentation Preparation
As dissections and microscopic investigations end, students need to focus on the Power Point
presentation and their posters.
Remind students to check off their rubric as each part is complete. Information can be found from textbooks, the Internet, knowledgeable people or dissection.
Students are often occupied with using all the PowerPoint features. Tell them to put the information on the slides first, then do the "cool" stuff.
Students should be able to provide the handout a day or two before the presentation to allow time for copying. The handout should include three multiple-choice questions that ask the class the MOST important aspects of the system.
Class Presentation
After students have completed their projects have each group present. You may grade the entire project during their presentations using the rubric.
Multiple Choice Assessment
Collect student questions to generate multiple-choice quiz. Be sure to check questions for fairness and fit to core objectives.
Give students the multiple-choice quiz and correct it as their final score on this assessment.

Assessment Plan
Use the grading rubric attached.

Bibliography
Lesson Design by Jordan School District Teachers and Staff.

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