Mathematics, Science & Technology

PART II.4

NOTE: This document is a work in progress. Parts II and III, in particular, are in need of further development, and we invite the submission of additional learning experiences and local performance tasks for these sections. Inquiries regarding submission of materials should be directed to: The Mathematics, Science, and Technology Resource Guide, Room 681 EBA, New York State Education Department, Albany, NY 12234 (tel. 518-474-5922).

NEW YORK
THE STATE OF LEARNING

http://www.nysed.gov

COMMENCEMENT

Standards & Performance Indicators

Energy, Matter, and Organization

MST 4 ▲ structure and function

NOTE: The simple story line or task introducing the activity can obviously be made more attractive by the many of you who are much more creative than I am. Have some fun!

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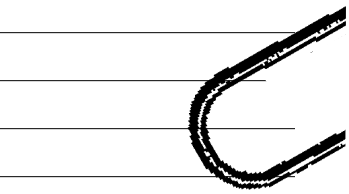
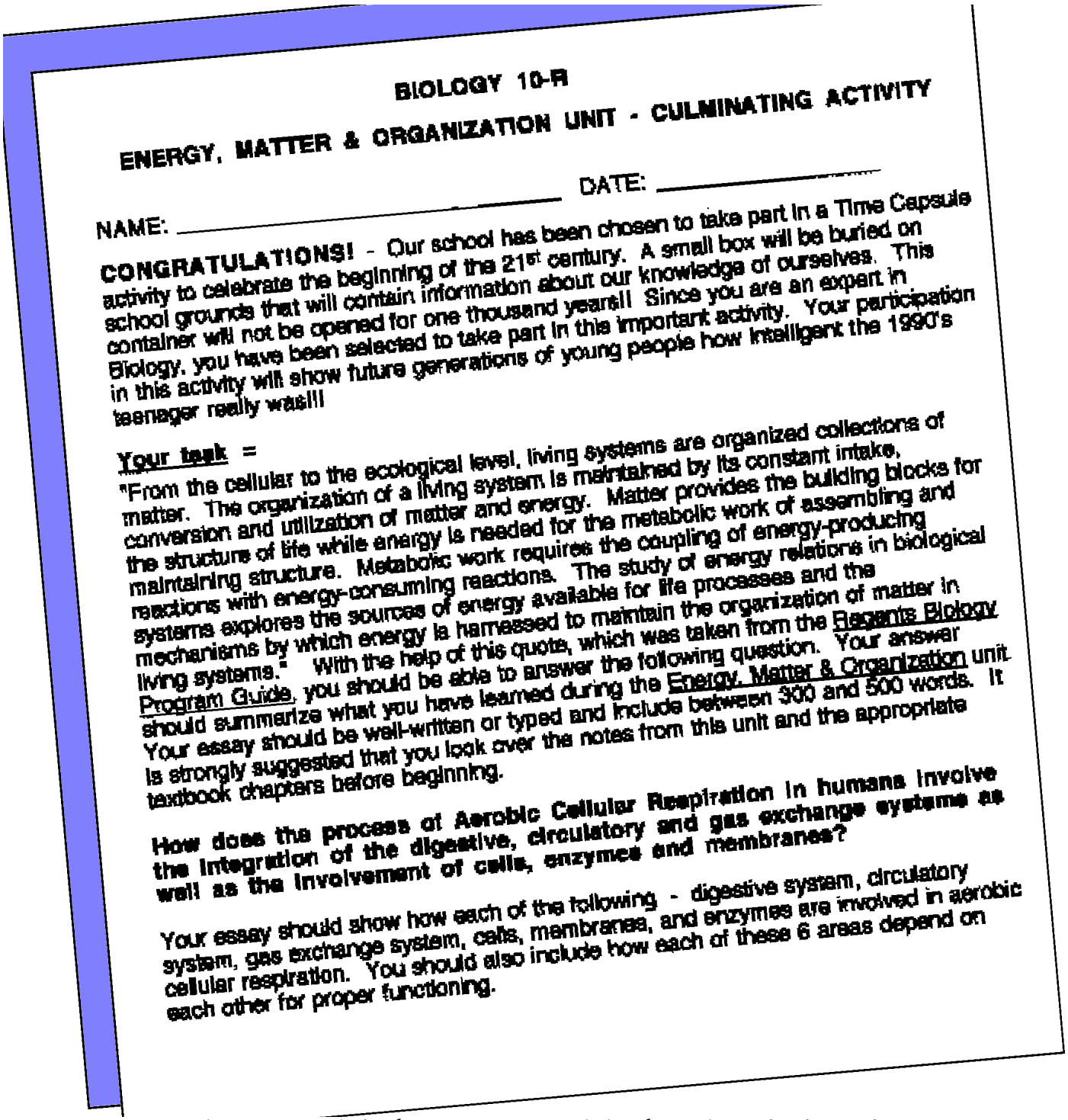


Grade 10

This activity is the final assignment in the *Energy, Matter, and Organization* unit, which is one of the six unifying themes covered in the *Regents Biology Program Guide*. Our biology variance is based on this program guide. The students have already studied: Levels of Organization (including cells), Membranes (including diffusion), Enzymes, Photosynthesis, Aerobic Cellular Respiration, Nutrition Gas Exchange Transport. This assignment has the students look at one central area—cellular respiration—and six side areas—human digestion, human circulation, human gas exchange, cells, enzymes, membranes. The students are expected to review each area and make connections between each side area and the central area. It is also expected that during this activity the students will recognize connections between each of the side areas. Requiring students to make connections helps assure construction of knowledge.

Students have one week to complete an essay. Students are expected to review each topic prior to writing the essay. Each student must prepare and submit a concept map or drawing depicting the "connections" among the areas prior to writing the essay. The concept map or drawing is returned to the student with teacher comments. The students are urged to use word processing for the final product. The activity is introduced by reading the short story line, which presents a simple problem to solve or task to do. There is some time following for student questions. The scoring guide is given to the students and explained at the time the activity is introduced. Students have the option of rewriting their essay after it has been graded and returned.

This activity forces students to analyze what has been studied and to make connections among those items studied. The students must take separate areas of study and explain how these areas are integrated for the benefit of the organism. For some classes, this activity may be altered to include as a final result, not an essay, but some artwork depicting the integration of all areas. Acooperative approach to this activity is also an alternative—with the final product expected to be a creative effort. Since we do project work including creative activities (e.g., posters, models, plays, debates, etc.) at other times during the year, the essay is a personal choice for the final product. It is important that students do not lose the opportunities to express themselves through writing.



BIOLOGY 10-R

ENERGY, MATTER & ORGANIZATION UNIT - CULMINATING ACTIVITY

NAME: _____ DATE: _____

CONGRATULATIONS! - Our school has been chosen to take part in a Time Capsule activity to celebrate the beginning of the 21st century. A small box will be buried on school grounds that will contain information about our knowledge of ourselves. This container will not be opened for one thousand years!! Since you are an expert in Biology, you have been selected to take part in this important activity. Your participation in this activity will show future generations of young people how intelligent the 1990's teenager really was!!!

Your task =

"From the cellular to the ecological level, living systems are organized collections of matter. The organization of a living system is maintained by its constant intake, conversion and utilization of matter and energy. Matter provides the building blocks for the structure of life while energy is needed for the metabolic work of assembling and maintaining structure. Metabolic work requires the coupling of energy-producing reactions with energy-consuming reactions. The study of energy relations in biological systems explores the sources of energy available for life processes and the mechanisms by which energy is harnessed to maintain the organization of matter in living systems." With the help of this quote, which was taken from the Regents Biology Program Guide, you should be able to answer the following question. Your answer should summarize what you have learned during the Energy, Matter & Organization unit. Your essay should be well-written or typed and include between 300 and 500 words. It is strongly suggested that you look over the notes from this unit and the appropriate textbook chapters before beginning.

How does the process of Aerobic Cellular Respiration in humans involve the integration of the digestive, circulatory and gas exchange systems as well as the involvement of cells, enzymes and membranes?

Your essay should show how each of the following - digestive system, circulatory system, gas exchange system, cells, membranes, and enzymes are involved in aerobic cellular respiration. You should also include how each of these 6 areas depend on each other for proper functioning.

Instructions and a scoring guide for the activity are provided to the students after four or five topics in the unit of study have been covered.

Since students have the opportunity to redo much of their work during the school year, they have the option of rewriting this essay (Last year, over 50 percent opted to rewrite.).

Students share their finished and graded essay with classmates during a cooperative activity in class. This enables students to see how others handled the question. Students also become aware that there is more than one possible answer to this question. Some students are asked how they would evaluate some of their classmate's essays. Self-evaluation and peer evaluation are part of a portfolio assessment later in the year and the sharing of student's essays is good practice for this.

Assessment

ASSESSMENT

Students are assessed according to the scoring guide that follows. For **part b** of the scoring guide, students must clearly indicate how a side area is connected to cellular respiration. For instance, a brief description of carbohydrate digestion resulting in glucose and the use of glucose in the cellular respiration process would satisfy this connection. For **part c** of the scoring guide, students must clearly indicate the connections between the side areas. For instance, a brief explanation of the role of enzymes in the digestion process would satisfy one of these connections.

The concept map or drawing is not graded, but is used as a means of assessing student progress in reaching the goal of the assignment.

SCORING GUIDE

E M O CULMINATING ACTIVITY

NAME: _____ DATE: _____

a) Correct description of aerobic cellular respiration.	2 points
b) How each of the 6 side areas (digestion, circulation, gas exchange, cells, enzymes and membranes) are connected to cellular respiration. Two points for each correct connection.	12 points
c) How each of the 6 side areas are connected with each other. Allow one point for each correct connection - up to 5 points.	5 points
d) Preliminary concept map/drawing	1 point
e) Correct spelling, grammar, usage (allow up to 4 errors).	3 points
f) Neatness.	1 point
g) On time.	1 point

* Total score multiplied by 4 = percent grade

** For each content mistake in the essay take 3 points off percent grade.

STUDENT ESSAY

AEROBIC RESPIRATION

Aerobic respiration is the process by which an organism gains oxygen and nutrients and rids itself of waste products. Simply, it is the method our bodies use to get the energy needed for survival. It involves breathing, eating, transport, digestion, and cellular respiration. In humans, aerobic respiration is a very complex process that involves many different systems and every cell of the body. The digestive system is needed to provide nutrients and minerals for life processes, and to dispose of wastes. the circulatory system is needed to bring these nutrients, plus the oxygen from the lungs, to all the cells of the body. The gas exchange system is needed to get the oxygen into the body and the carbon dioxide out.

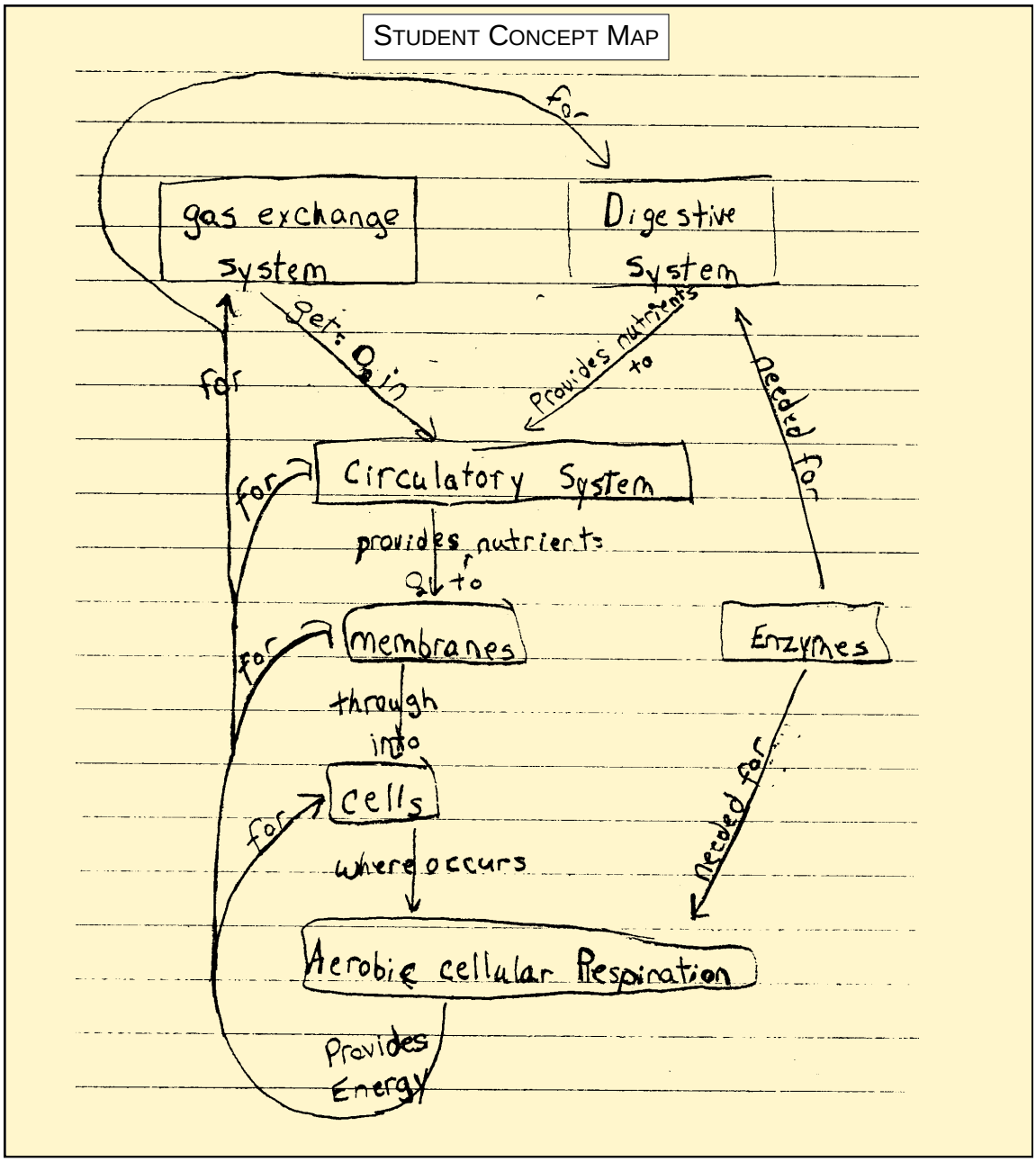
Cells make up all the systems used in aerobic respiration. They also carry out cellular respiration. This is an essential part of aerobic respiration because it breaks down nutrients into the energy needed to carry out life processes. Aerobic respiration requires many chemical reactions, especially during digestion and cellular respiration. All of these reactions require enzymes. Membranes are necessary in several processes. For example, in cellular respiration, oxygen and glucose have to be brought into the cell from the bloodstream. The plasma membrane, which surrounds the cells, is needed to transport the oxygen and glucose into the cell and to keep them there.

When we eat, the food we take in is broken down in our digestive system. The digestive system uses enzymes to break down the food into substances the body needs to carry out aerobic respiration. These substances are then absorbed into the bloodstream to be taken throughout the body. The substances are also transported back to the digestive system in order to allow it to carry out digestion.

The human circulatory system is made up of the heart, the blood, and the blood vessels. It feeds nutrients and oxygen to cells. It has to get nutrients from the digestive system and oxygen from the lungs through the gas exchange system. All the cells of these systems, however, need the nutrients and oxygen also. They get them from the circulatory system. The circulatory system also carries away the waste of all the cells of these systems, as well as the rest of the body.

The gas exchange system allows oxygen to enter the bloodstream and carbon dioxide to leave. When the blood comes in contact with the membranes of the lungs, it absorbs oxygen and gets rid of carbon dioxide through the membranes. The blood also feeds the lungs and takes away the wastes produced by cellular respiration.

All of these systems are essential to one another. None of the systems could exist without the digestive system breaking down food into the nutrients for survival. Having the nutrients, however, would not do any of the systems any good without the circulatory system to transport them to where they are needed. And even if the nutrients were at the cells that needed them, oxygen from the gas exchange system is needed to use them to produce energy in cellular respiration. Some of this energy is used to keep the heart, digestive system and lungs working. None of these systems could carry out respiration without the others.



REFLECTION

This type of activity is easily adaptable to other subject areas, such as Health; satisfying Standard 3 of the Health, Physical Education, and Home Economics Standards ("students will understand and manage personal ... resources"). Students making an action plan for life can weave in their essay information stressing diet, exercise, etc.

Extensions of this activity would be to have students consider and describe reasons why cellular respiration is not at peak. Is there a problem with one of the six areas? Have students select one of the areas and explain how changes in this area affect cellular respiration (for example; poor nutrition, cardiovascular disease, emphysema, etc.).

REFLECTION:

COMMENCEMENT

Standards & Performance Indicators

Bioethics

MST 4

- ▲ genetic engineering
- ▲ preserving diversity
- ▲ environments change

MST 7

- ▲ analyze problems/issues
- ▲ work effectively
- ▲ gather/process information
- ▲ generate/analyze ideas
- ▲ present results

In addition to written activities and research, a significant component of this learning experience involves cooperative group work in problem solving and decision making. Thus, it can meet the needs of students with different learning styles and a range of abilities.

Teacher

BIOETHICAL DECISION-MAKING REFERENCES

- Bioethics For ums. (Student Resource Book, Teacher Resource Book, Laserdisc) Videodiscovery, Inc. Seattle, Washington. 1995.
- DeDecker, Peter F. "Teaching Bioethical Decision-Making in High School," The American Biology Teacher. 49(7): 428-432. 1987.
- Kieffer, G. H. 1979. "Can Bioethics Be Taught?" The American Biology Teacher. 41(3): 1 76.
- McConnell, T. C. 1982. Moral Issues In Health Car e: An Introduction To Medical Ethics, Monterey, CA: Wadsworth Health Sciences Division.
- Yashon, Ronnee. Case Studies in Bioethics. 1994.

Objective: To introduce students to some ethical issues in biology and provide them with a model to make decisions.

NOTE TO THE TEACHER: Since some of these issues may be sensitive to students, we suggest that you preview all material and present it with careful attention to students' individual beliefs.

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Grades 9 & 10

The use of a constructivist learning model is especially important and appropriate in this experience, as students come to this unit not only with misconceptions about the nature of the issues, but have not yet connected their newly constructed knowledge in biology to their beliefs and values.

This learning experience was designed to introduce students to some of the critical bioethical issues of our modern society and to enable them to begin to identify the values that inform their decisions. Aconstructivist framework is implicit in this experience, with the teachers creating an environment in which their students are encouraged to think and to explore ideas. The bioethical issues that are introduced are of emerging relevance to these students and they become involved in thinking and learning about current societal problems that are real and meaningful to them.

To engage student interest questions are posed to the students, such as:

- What do you value?
- What are ethics?
- When does life begin and end?
- What distinguishes human life from non-human life?
- Who deserves to receive an organ transplant?
- When is it okay to sacrifice an animal?

Students then explore their own values and beliefs by confronting several ethical dilemmas and work in a cooperative group to formulate decisions on critical issues in bioethics. They think about real problems and, with additional insight gained from group discussion, formulate their values and opinions on important societal issues. Finally, they apply their newly constructed knowledge and values to an ethical dilemma of their choice.

The unit on *Bioethics* can be taught near the end of the school year, after students have studied genetics, comparative anatomy (including dissections), ecology, and environmental issues. Therefore, they have constructed knowledge of the major ideas in biology. However, there is flexibility in its placement in the curriculum, for example, it can be taught early in the year as an introduction to ideas in Biology.

One goal of this learning experience is to support student progress toward achieving the learning standard on *Interdisciplinary Problem Solving*:

1. Identification of Values

Students identify and clarify their values by responding to three exercises:

a. personal value statements
b. hammer exercise
c. quick value judgment.

Through class discussion, the teacher helps students identify and prioritize their values, make decisions regarding hypothetical ethical dilemmas, and defend their decisions with value statements, and encourages thinking about the sacrificing of organisms, from simple to complex.

2. Case Studies of Ethical Dilemmas

In cooperative groups, working with case studies, students confront and discuss ethical dilemmas. They must come to consensus regarding their decision on each case, requiring them to communicate effectively within their group.

3. Personal Case Study Analysis

Each student writes an essay about an ethical dilemma of his/her choice, using a worksheet to focus the student on the process of reaching a decision.

DAY ONE

A. Define *ethics* and *bioethics*

Ethics: Asystem of morals or values.
Bioethics: The study of the ethical and moral questions involved in the application of new biological and medical findings, as in the fields of genetic engineering, neurobiology and drug research.

B. Define *value*

Value: Aprinciple, standard, or quality considered worthwhile or desirable. Kieffer's definitions (1979):
Values: 1) indicate what is judged to be "good"
2) imply preference
3) are supported by rational justification
4) evoke strong feelings or intense attitudes
5) specify a course of action.

It is important to impress upon students that values are individual. All responses for the unit will be written on the *Personal Reference Sheet* (PRS). The completed PRS is private and will be read by the teacher only.

Pass out the *Personal Reference Sheet* and turn to the *List of Values*. (NOTE: This list is meant to reflect things important to teenage students in helping them make life choices. This is NOT a final list; teachers and students may wish to add to the list. One possible suggestion is that students brainstorm their own list as a class.) Have students pick the three values most important to them, write them in the space provided and state why these are most important to them.

C. *Quick Value Judgements*

Read the "Quick Value Judgements" to the class. Each student must answer "yes" or "no" within 15 seconds and record their answer on their PRS. Student should then choose from the list of values which item most helped them to make this decision.

Quick Value Judgements

l) Agood friend cheats on a science test, do you tell?
2 You find a wallet with 50 dollars inside and a driver's license. Do you take the money?
3) You (if you are female), or your girlfriend (if you are male) find out that your unborn child is retarded. Do you abort the fetus?

Of particular importance in supporting the assessment of student performance is the depth and thoughtfulness of the student's arguments in support of his /her ethical decisions.

4) Your mother is killed in a car accident by a drunk driver. Would you seek the death penalty for the driver?
5) Your favorite athlete makes racist comments. Do you stop watching him or her?
6) Your best friend really likes a certain boy/girl. This person asks you to go to a movie. Do you go out with him or her?
7) During a group project for science, the teacher mistakenly gives you credit for something someone else did. Do you tell the teacher about the mistake?
8) Your Regents Biology final is the next day, but your friend calls in the morning and asks you to go to Jones Beach for the afternoon. Do you go?
9) Several friends want to feed Alka Seltzer tablets to a sea gull to see if it explodes. Do you try to stop them?
10) Your little sister/brother has been driving you crazy all afternoon. Finally, she/he hits you in the face. Do you hit him/her back?

D. *Hammer Exercise*

This exercise is designed to help students define the value of living things. The class is presented with a list of organisms and are given the imaginary opportunity to "hammer" (kill) each organism. The point at which they stop reveals something about the values of the participant.

List characteristics that distinguish human life from non-human life. Discuss situations in which it may be acceptable to sacrifice a non-human life. Each student should list the last organism to be hammered on their list and give at least one reason.

E. Define *moral problem*

McConnell (1982) defines a moral problem as "... a situation in which there are moral considerations to support one action, say act A, yet there are moral considerations to support another action, act B. Act Aand Act B cannot both be done, but it must be known,which is more important morally—which is the right act."

Name: Anna
Bioethical Decision Making

Personal Reference Sheet

24.25/25

Your three most important values are:
food/warmth/shelter
friendship
truth/wisdom/insight

Quick Value Judgements

friendship
honesty
empathy
justice
human dignity
friendship
honesty
self control
animal rights
self control

	Yes	No
1. friend cheats on test		✓
2. lost wallet		✓
3. retarded child		✓
4. drunk driver		✓
5. racist athlete		✓
6. friend w/ crush		✓
7. group project in science	✓	
8. Jones Beach		✓
9. Alka Seltzer	✓	
10. younger sibling	✓	

Hammer Exercise
Which animal is last on your hammer list?
SNAKE RAT
Why?
RATs are disgusting and dirty. they carry disease
cats + dogs can carry disease - why are rats disgusting?
SNAKES are poisenous and slimy - not all are disgusting? poisonous!

human
verbal language
reason/developed knowledge
conciousness
self aware
"manners"
dignity
technology

Which characteristics distinguish human life from non-human life? There are many things that are different between humans ~~bec~~ and non-humans because we can't understand what they ~~thing~~ think -?
what else?

4.25/5

Personal Value Statements

When is it alright for a human being to sacrifice an animal (other than to eat it)? (Support your answer with personal reasons.)

It is ok if you are being attacked (self-defense)
To learn about for medical reasons.
To test for cures for AIDs

5/5

When does life begin? (Support your answer with personal reasons.) Life begins when the egg is fertilized. because that is when it will actually become a human 5/5

When does life end? (Support your answer with personal reasons.) Life ends when you die (your brain + heart stop working) It is better to end life how you want it to end. Like it is better to die if you are happy with your life 5/5

Upon what basis should organ recipients be chosen? (Support your answer with personal reasons.) Organ recipients should be chosen by considering their age, who is depending on them, the quality of their life so far + what potential they have. 5/5

The Case Studies

DAY TWO

Case Study #1—Frozen Embryos
The case study may be read outside of class. Students should list their personal decision about this case study and give relevant reasons to justify it. The objective is to have students begin to define in their own words when life begins.

In class, group students and hand out *Bioethical Decision Making Group Worksheet.* Discuss how to use the sheet (perhaps define the problem as a class?). Groups must reach a consensus decision without anyone compromising their personal values.

As a class, discuss the decisions reached by each group and list values and reasons on the board. Brainstorm a list of characteristics that define when life begins. Each student should write a personal definition for their *Personal Reference Sheet*.They must answer the question clearly and coherently. Values that apply to the answer must be justified.

Bioethical Decision Making
Group Worksheet

Part I
Your Name:

Team Members:
1.

2.

3.

Title of Problem:

State the nature of the problem using the word "ought." For example, "Who ought to decide whether HIV testing for marriage licenses be mandatory".

List the facts presented in the case study.

List the stakeholders in the case study.

DAY THREE

Case Study #2A/ #2B—Patient in a Coma / Patient with Alzheimer's
Use the same format and worksheets as **Day Two** with a different case study. Allow cooperative groups to choose one of the two options to discuss within their group. At the end, the students will define when life ends on their *Personal Reference Sheet*.

Bioethical Decision Making

Case Study #2A

On April 14, 1975, Karen Ann Quinlan, a young New Jersey woman, was admitted to a hospital near her home. Doctors decided that she had taken a tranquilizer and then drank a quantity of alcohol. The drug/alcohol combination had caused her to sink into a coma, an unconscious state from which nothing could rouse her. Her brain was irreversibly damaged; it had ceased to function and was no longer working to keep her alive. Doctors had to use machines to force air into her lungs. Her heart continued to beat, but her brain was unlikely ever to function again.

When physicians gave this information to her parents, they requested that her life-support machines be turned off so that she could die. But hospital officials objected, and eventually the matter was placed before the courts.

Ought she be taken off the life-support system?

Case Study #2B

In Florida recently, a seventy-six year old man shot and killed his wife because she was suffering from Alzheimer's disease, a slow, progressive failure of certain nerve cells in the brain that leaves its victims helpless and unable to care for themselves, unaware of who they or their loved ones are.

The husband said he could not watch his wife die in such a manner. The courts in Florida thought otherwise and sentenced him to prison. The governor of Florida later held a hearing about the case but refused to consider pardoning the man.

Ought he be acquitted?

DAY FOUR

Case Study #3—Organ Transplant Recipient Selection
Students choose who will receive the transplant and come to consensus in their group. ***All decisions must be supported with relevant values and reasons***. As a class, identify which characteristics of those individuals selected for organ transplant are desirable and which characteristics of those not selected are undesirable. Students should list those characteristics that they find desirable on their PRS. These indicate some of their personal values .

Anna
Science

Assisted Suicide Gets Legal Support

Should assisted suicide be legal? So far, there are only nine states in the United States that have banned Assisted Suicide. They believe that patients were being put to death against there own wishes. They also think that the patient should be able to decide how and when they die.

In my opinion, assisted suicide should be legal. This should be allowed only if the patient is terminally ill and in extreme pain. The patient should have a right to decide whether they should live or die. Most people though, would rather die than continue living while suffering.

page one

suicide is legal in most states. It should remain legal and it should only be used in certain cases. Most patients believe that suffering is even worse than death so the physician will aid them in assisted suicide

Assisted Suicide should only be used to relieve pain and discomfort for terminally ill patients. (Terminally ill means they are going to die of their disease)

Recently, a man named Jack Kevorkian was aquitted of two charges that he helped twenty seven people commit suicide. He was aquitted because most of the patients were terminally ill. There is a clause in the law that says that you cannot be convicted for assisting a suicide if they had been trying to relieve pain and suffering. Kevorkian is going to have a third trial because he was charged in assisting ~~a~~ two woman that were not terminally ill. For this charge, he should be put in jail.

As of right now, assisted

page two

page three

Name: _____ Date: _____

INDIVIDUAL DECISION-MAKING MODEL

Directions: *Choose a case study. Fill in this outline sheet given the information in the case study. Use this outline to write a opinion paper about your case study.*

I. State the Question

_____

II. Part II. List the 5 solutions to this question. Then rank them 1-5 with one being your first choice.

_____ A. _____

_____ B. _____

_____ C. _____

_____ D. _____

_____ E. _____

III. Restate the #1 solution. Then from the list of values, list four or more values that you used to choose solution #1.

Solution: _____

Values: _____

_____

_____

_____

_____

IV. If the person in your case study choses your #1 solution, what will happen? List three things that might happen. Think about legal problems, psychological, medical, family and government implications.

1. _____

2. _____

3. _____

V. List three reasons someone might not agree with your decision.

1. _____

2. _____

3. _____

DAY FIVE

Students pick a case study that is personally relevant to them* and use the *Individual Worksheet* as an outline. The student is to write a report describing the case and presenting their decision ("I believe that IS right because...") and state the evidence reasons to support their decision. This report is to be turned in with their PRS.

*Acompilation of case studies may be kept on file by teachers for student use. Or the students may use current events, i.e., cloning of mammals.

ASSESSMENT

Students are graded on *Personal Value Statements* etc. They are assessed on the group work, including their ability to work effectively in the group. They are assessed on their personal case study analysis. Their opinions must be clearly stated and supported.

RUBRIC

REGENTS OPTION LABORATORY

BIOETHICAL DECISION-MAKING

PART I

PERSONAL VALUE STATEMENTS	**GRADING SCALE**
List of personal values, quick value judgements, hammer exercise 1 point - all three personal values listed and explained 2 points - quick value judgement table completed 2 points - hammer exercise and explanation provided	= 1 to 5 points

The following four questions are graded using the following criteria:

1 point - answer was submitted
1 point - value was stated
1 point - answer was clear and coherent
2 points - explanation clearly showed how value related to the answer

When is it all right to sacrifice an animal other than for food?	= 1 to 5 points
When does human life begin exactly?	= 1 to 5 points
When does human life end?	= 1 to 5 points
What criteria should be used to determine who should receive an organ transplant?	= 1 to 5 points

PART II

CASE STUDIES	**GRADING SCALE**
Personal case studies analysis and completion of personal case worksheet	1 to 10 points

1 point - work was submitted with individual decision-making model
1 point - English language used skillfully
2 points - work was organized (introduction, body, and conclusion)
2 point - work was factually accurate
4 points - decision was supported with an explanation of values
- values were stated
- solution was stated
- positive and negative consequences were stated
- an explanation of values was given

Rubric continued

Ability to work effectively in a group — 1 to 5 points

Grade holistically using the following scale:

5 points - effectively worked with lab group as a leader
4 points - effectively contributed to lab group work
3 points - worked as a follower, required reminders to stay on task
2 points - watched lab group work, required reminders to stay on task
1 point - watched lab group work and distracted others during work
0 points - refused to work in lab group

Completion of decision making worksheets — 1 to 10 points

Grade holistically according to the following scale:

10/9 points	content complete, 95-100% accurate, responses fully explained and well-thought-out, and clear written expression
8/9 points -	content complete, 85-95% accurate, clear written expression
6/5 points -	content complete, 70-85% accurate, written expression lacked full clarity
4/3 points -	content somewhat complete, many inaccuracies, careless reasoning errors, poorly written
2/1 points -	mostly incomplete, support lacking, disorganized
0 points -	work not submitted

TOTAL POINT VALUE = 50 points

REFLECTION:

REFLECTION

This learning experience could also be taught in conjunction with a Social Studies unit on Law and Constitutional rights and could involve the English department. The students could prepare for and then conduct a debate on the issues they have studied. Students would then have to prepare to defend either side of an issue, giving them a different personal perspective.