Biology:
“Race: The Power of an Illusion
(adapted from PBS series by the same name)”

Life Learning Academy Project-Based Curriculum

Project Title: Race: The Power of an Illusion (adapted from PBS series by the same name)

Project Design Team and/or Instructors: Wayne Brock and Park Guthrie

Subject Area(s): Biology, Integrated Science

Grade Level(s): 9-12

Project Overview:

This unit was designed around the PBS video series *Race: The Power of an Illusion* and corresponding web resources at pbs.org. We followed curriculum designed by Scott Bronson. In this unit, students learn to question their underlying assumptions about the biological basis for classifying people into distinct racial groups. In the first week, students work through a series of interactive, on-line modules, video clips, readings and discussion, and class activities which teach that there is no scientifically valid way to describe human racial groups. In the second week, students use this knowledge to create an informative video clip.

Educational Standards Addressed:

Nature of Science Standard 11 Level IV (Grades 9-12)

1. Knows ways in which science distinguishes itself from other ways of knowing and from other bodies of knowledge (e.g., use of empirical standards, logical arguments, skepticism)
2. Knows that scientific explanations must meet certain criteria to be considered valid (e.g., they must be consistent with experimental and observational evidence about nature, make accurate predictions about systems being studied, be logical, respect the rules of evidence, be open to criticism, report methods and procedures, make a commitment to making knowledge public)
3. Understands how scientific knowledge changes and accumulates over time (e.g., all scientific knowledge is subject to change as new evidence becomes available; some scientific ideas are incomplete and opportunity exists in these areas for new advances; theories are continually tested, revised, and occasionally discarded)
4. Knows that from time to time, major shifts occur in the scientific view of how the world works, but usually the changes that take place in the body of scientific knowledge are small modifications of prior knowledge. (taken from www.pbs.org/race)

Life Sciences Standard 4 Level IV (Grades 9-12)

5. Knows ways in which genes (segments of DNA molecules) may be altered and combined to create genetic variation within a species (e.g., recombination of genetic material; mutations; errors in copying genetic material during cell division)

Life Sciences Standard 7 Level IV (Grade 9-12)

6. Knows how organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their evolutionary relationships (e.g., shared derived characteristics inherited from a common ancestor; degree of kinship estimated from the similarity of DNA sequences)

Life Sciences Standard 12 Level IV (Grades 9-12)

7. Uses technology (e.g., hand tools, measuring instruments, calculators, computers) and mathematics (e.g., measurement, formulas, charts, graphs) to perform accurate scientific investigations and communications

Project Goals and Rationale:

Goal #1: Students will be able to explain why there is no biological basis for categorizing people into traditional racial groups.

Rationale for Goal #1: Most people have misconceptions about the biological basis for racial categorizations.

Goal #2: Create a short video which illustrates a portion of the content.

Rationale for Goal #2: Provides students an opportunity use their knowledge to create a meaningful product and develop technology skills.

Project Objectives and Student Outcomes:

Objective #1: Students will articulate two reasons why humans cannot be categorized into racial groups.

Objective #2: Students will be able give two examples of inherited traits.

Objective #3: Student will be able to explain one hypothesis accounting for human variation in skin color.

Objective #4: Students will be able to explain why sickle cell anemia is not a “racial” disease.

Objective #5: Students will be able to explain that human genetic diversity is extremely small compared to other species.

Objective #6: Students will work cooperatively in a small group.

Student Outcomes: Students will create a 30-60 second video which illustrates a component of the content. The target audience will be peers.

Project Outline/Detailed Description:

See Project Outline.

Key Assignments:

(1) Daily Journal Entries
(2) Video Project

Assessment Methods and/or Tools:

(1) Student Daily Participation (as determined by teacher)
(2) Student Journals
(3) Small Group Video
(4) Teacher Observation of Group Work
Optional Information:

Context and Purpose of project:

This two-week project relates to larger, all-school theme focusing on Race and Diversity.

History of Project development:

We relied heavily on the PBS series *Race: The Power of an Illusion*. We also used our experience creating student videos in a variety of classes and contexts.

Texts and Supplemental Instructional Materials:

Bronson, Scott . " The Empirical Challenges of Racial Classification." Race: The Power of an Illusion . 2003. California Newsreel. Aug 10, 2005 http://www.pbs.org/race/000_General/000_00-Home.htm

Bronson, Scott . " Comparing mtDNA Sequences to Learn about Human Variation." Race: The Power of an Illusion . 2003. California Newsreel. Aug 10, 2005 http://www.pbs.org/race/000_General/000_00-Home.htm

Jared Diamond, "Race Without Color," Discover Magazine, 11/94

Describe Yourself Survey

Name: _____

Survey

1. Describe yourself in 5 words or less.

2. What race do you consider yourself?

3. How did you get your race?

4. Which races are represented in San Francisco? Estimate percentages of each race that live in San Francisco.

5. Which races are represented in United States? Estimate percentages of each race that live in the United States?

6. Which races are represented in the world? Estimate percentages of each race that live in the world?

7. What is race? Write a definition for it.

Human Trait Inventory Survey

Name_____

Trait	**Variations**
Thumb	Hitchhikers _____ Non-Hitchhikers____
Tongue	Can curl _____ Cannot curl _____
Hairline	Widow's Peak_____ No peak _____
Hand clasp	Right on top_____ Left on top_____
Lactase	Lactose Intolerant_____ Lactose Tolerant_____
PTC	Taster_____ Non-taster____
Cheeks	Dimples____ No Dimples____
Fingerprint	Whorl____ Arch_____ Tented Arch____ Loop____

Questions about the Skin Color Handout (lesson 3)

1. Which areas of the world receive the most ultraviolet radiation? Which areas receive the least?

2. Does skin color correlate with "race" (as defined by the US Census Bureau) or with something else?

3. What advantage does dark skin confer on those mothers (and their developing babies) who live in areas that receive high amounts of ultraviolet light? What might happen to a light-skinned pregnant mother (and her baby) if they were exposed to large amounts of ultraviolet light?

4. What is rickets? What causes rickets? Why might a dark-skinned person living in an area that gets little UV light be more prone to rickets?

Sickle Cell Handout Questions

1. How does a person get sickle cell anemia?

2. How does a person become a sickle cell carrier?

3. What caused sickle cell to be more common in some areas of the planet than others?

4. Explain why being a sickle cell carrier or having sickle cell anemia is not a marker of race but shows that one is descendant of people that lived where malaria was common.

Lesson #	Content Outline	Teaching Sequence	Equipment and Materials	Preparation	Assessment

Race: The Power of an Illusion Unit Outline

1 S/B 4	Uncovering Assumptions--- Students complete a survey revealing their underlying assumptions about race and ethnicity. Next, they complete a sorting activity which reveals inconsistencies when attempting to categorize people into racial groups based on physical appearance.	Complete Student Survey (10 min) "Sorting People" exercise on www.pbs.org (20 min) Discussion of "Sorting People" (5min) Read and discuss Students complete daily journal.	Photocopies of student surveys Computer stations with internet	Create and photocopy student surveys Bookmark website page Prepare guiding questions.	Student surveys Daily journal entries
2 S/B 1,2,3,4	Students learn that there are numerous human inherited traits by which we could group people rather than the superficial physical traits used to categorize people into races. These	Students complete survey of inherited traits. Students participate in "re-grouping" exercise demonstrating non-concordance of human traits. Students read sections of "Race without Color" in small groups. Both sections are found on page 86 of the article. The first	Survey of inherited traits. Copies of article "Race without Color"	Create survey of inherited traits. Copy article "Race without Color"	Small group presentations Daily journals

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	other traits yield different groupings than our common racial groupings, yet are equally "valid" ways to sort people.	section covers the geographic distribution of sickle cell trait and the second section discusses the evolution of adult lactase production. Small groups present the information in the section of "Race without Color" that they read.			
3 S/B 6	This lesson follows "The Empirical Challenges of Racial Classification" Activity #4.	Define these words with the class, non-concordance, gradual variation, within-group versus between-group variation (5 minutes) After defining terminology show the class the two short video clips from "Race: The Power of an Illusion"(DVD Scenes #8, #10, #11, #12) Each group reads one of the reading selections and creates a poster summarizing the content of their respective assigned reading. The readings about sickle cell trait and skin color are in activity #4 of "The Empirical Challenges of Racial Classification". (www.pbs.org/race)	Butcher paper, markers, DVD player	Copies of reading, reserve DVD player	Student's present poster to class.

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		The student groups create poster containing the following i. Title in big ii. Names of group members iii. Answers to the 4 questions/definitions about their reading. (page 7) iv. 2 sketches or drawings Each group presents their poster to the class. Class discussion of the following question Why doesn't racial classification work? Revisit three reasons. Students record responses in their journal.			
4 S/B 5,6,7	Students compare mtDNA Sequences to Learn about Human Variation	This lesson follows Activities 1,2 and 4 of "Comparing mtDNA Sequences to Learn about Human Variation" from "Race the Power of an Illusion"	Computers with internet access, DVD player	Reserve equipment	Students write a paragraph summarizing their findings from the lesson in journal entry

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5 S/B 1-7	Beginning of Video Project	Discussion of previous video production experience Begin human camera exercise. Student in pairs take turns being camera operator and being the camera. The person being the camera closes their eyes and opens them when the camera operator taps them gently on the head. The camera closes their eyes when the camera operator taps them a second time. The camera is led around and positioned by the camera operator. The camera operator attempts to communicate a theme or story to the camera. Then they switch roles. Discuss the results of the activity. Compare the different subjects were	Computer and Video projector	Reserve equipment	

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		communicated by focusing on a series of images. Discuss how this might be useful in creating a short film. View sample videos of short films found on the internet. Discuss how filmmakers can tell a story in a short amount of time. Assign groups to start their final video project. Have them start brainstorming about topics and how to present them. Groups should have chosen a topic from the lessons they have just completed that they want to present or illustrate in the video.			
6	Continuing Video Project	Draft scripts in small groups. Groups should start assigning tasks and creating a storyboard. Storyboard should be created by setting up scenes and taking a Polaroid photo of the scene. The photos can be arranged into a sequence and provide the instructions for filming. When storyboard is complete and approved by teacher groups can begin filming.	Computer and Video projector, Poloroid™ camera, video camera, and video editing equipment	Reserve equipment	

Lesson #	Content Outline	Teaching Sequence	Equipment and Materials	Preparation	Assessment
7	Video Project Completion	Students edit video and re-shoot scenes as necessary to complete their projects Videos are screened and discussed by the class.	Computer and Video projector, video camera, and video editing equipment	Reserve equipment	Student's final video product.