

Cultural and Religious Sensitivity (CRS) Teaching Strategies Resource

Developed by Dr. Connie Bertka as part of the Teaching Evolution through Human Examples (TEtHE) project

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DRK-12

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Smithsonian
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Why this resource? What are the goals?

Cultural and religious objections by some to the teaching of evolution negatively impacts students' willingness to engage the topic.

The purpose of this resource is to both encourage and help equip high school teachers to promote positive dialogue around the topic of evolution in their classrooms.

The specific goal is to create an environment that allows for a **greater understanding of evolution** by helping teachers to both acknowledge and manage cultural and religious controversies, as needed, should they arise in the classroom.



Instructional Approach: Acknowledging the Controversy

- Acknowledging the Controversy

Acknowledging the controversy is a means for students to discuss comments and ideas they have heard within the cultural conversation regarding evolution, but may have never been able to ask within a scientific setting.

-> Encourage a scientific understanding of evolutionary theory

- NOT “Teaching the Controversy”

“Teaching the Controversy” provides an inaccurate view of scientists’ acceptance of evolutionary theory.

-> Cast doubt on validity of evolutionary theory



Contents of the Resource – needs vary!

- **PART ONE – FOUNDATIONAL INFORMATION**

Background information to inspire confidence in the teacher's ability to respond to questions about cultural and religious controversies

- **PART TWO – CLASSROOM ACTIVITIES**

Activities to engage students in directed discussions that acknowledge concerns

The intention of this resource is not to specifically resolve any conflict the student may see between their personal worldview and the scientific account of human evolution, but to help create a non-threatening classroom environment.



Part 1: Foundational Information

Concise description of issues that are especially pertinent to cultural and religious concerns about the teaching of evolution.

Topics:

1. Nature of Science
2. Range of Creationist Beliefs
3. Possible Relationships between Science and Religion
4. Legal Cases Dealing with the Teaching of Evolution



Part 1: Foundational Information (Example)

Topic 2: Range of Creationist Beliefs, Pages 11–15

Being aware that there is a range of creationist beliefs is a useful CRS teaching strategy because it can disabuse the notion that all creationists are by definition anti-evolutionists. Specifically, recognizing a range of creationist beliefs will:

1. help address concerns that religious belief and an acceptance of evolution are incompatible;
2. help guard against the assumption that we can predict a student's attitude toward evolution from knowledge of the student's religious affiliation;
3. highlight the reality that religious people experience not only challenges but also opportunities in incorporating evolution into their religious worldviews, with many finding that knowledge of evolution and its scientific basis broadens and deepens their religious faith; and
4. relieve science teachers of the burden of having to help students come to any kind of resolution for conflicts they experience when they study evolution.



Part 2: Classroom Activities

Two 50-75 minute activities designed with different classroom contexts in mind.

1. Directed Discussions “Why Study Evolution?”

2. Historical Role Play “How Do People Think About Evolutionary Theory?”



Classroom Activities

- Activity 1: “Directed Discussion: Why Study Evolution?”

When? before evolution curriculum unit

Where? in areas with high resistance to learning evolution

Why? acknowledge students’ concerns; encourage scientific understanding of evolution

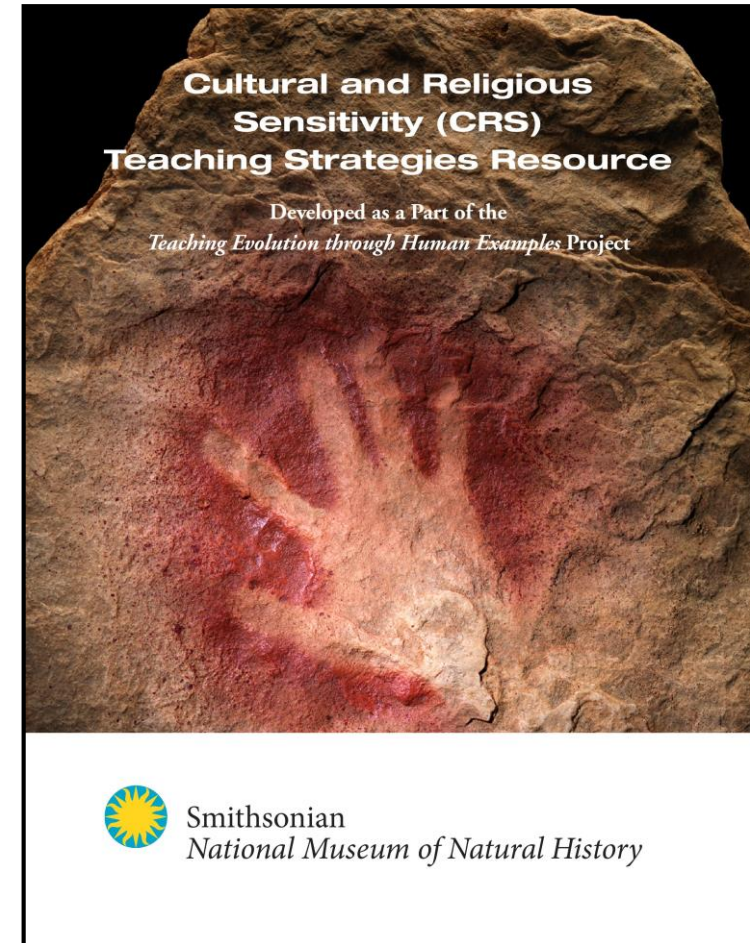
Student Exercises:

Master 1.1: What Do You Know About Evolution? (hmk)

Master 1.2: Ways of Knowing

Master 1.3: Relating Science to Other Ways of Knowing

Master 1.4: Evolution as a Tool to Address and Understand Human Biological Challenges (hmk)



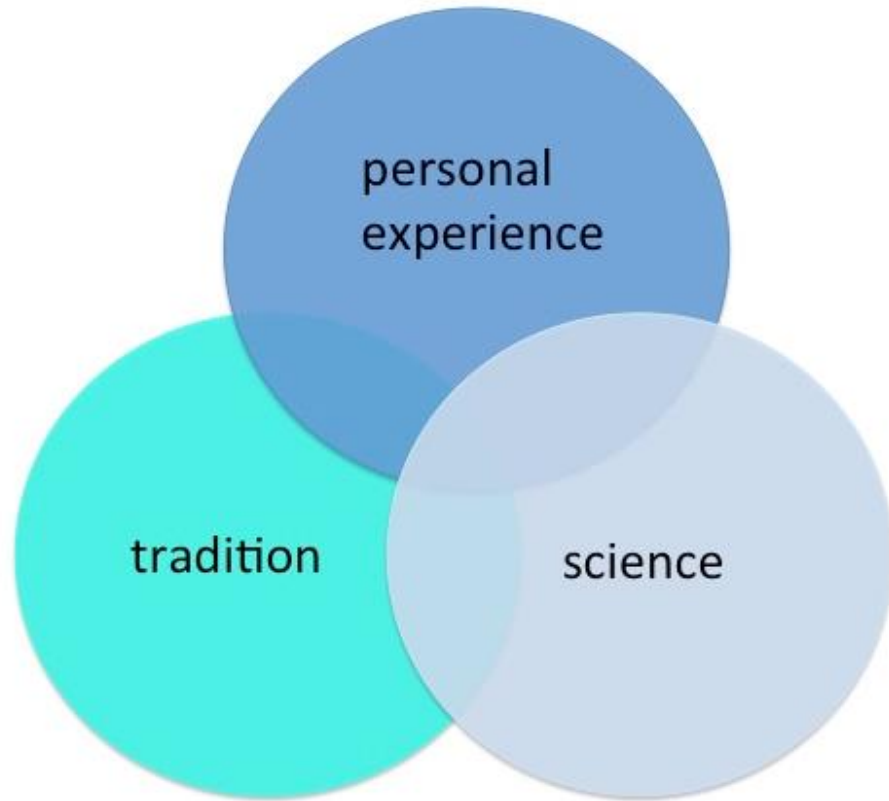
Master 1.1:

What Do You Know About Evolution?

1. Summarize the theory of evolution in three sentences or less.
2. Are you aware of explanations for the variety of life (including animals, plants, microbes, and other forms of life) found on Earth today, other than the theory of evolution, that are important to you or someone you know? If so, list one or two such explanations along with a one- or two-sentence description of each.
3. Some people are concerned about studying the theory of evolution. List one or two concerns that you are aware of that others, or you, may have about studying evolution.



Master 1.2: Ways of Knowing



When people think about the world, they often draw on more than one kind of knowledge. Figure 1 suggests three common ways of knowing. How does science as a way of knowing differ from the other ways of knowing listed in the figure?

Master 1.3:

Relating Science to Other Ways of Knowing

Religious and cultural traditions, as well as the individual members of these traditions, vary in which ways of knowing they emphasize when thinking about the world. They also vary in their approach to science in general and the theory of evolution in particular. Generally, one of three approaches to relating science to religion is practiced.

Conflict, separation, or interaction



Master 1.3:

Relating Science to Other Ways of Knowing

A **conflict** approach to science and religion assumes that either religion alone or science alone establishes the standard of truth.

A **separation** approach assumes that science and religion by definition cannot be in conflict with one another because the two are concerned with different subject matter and are completely independent ways of knowing. Religion deals with questions of meaning and purpose, but the concern of science is how nature works.

An **interaction** approach to science and religion is cognizant of the differences between the two and is careful not to disregard the limits of either as a way of knowing. However, traditions and individuals who adopt an interaction approach are open to reformulating religious doctrines in light of current science.



Master 1.3:

Relating Science to Other Ways of Knowing

Listed on CRS Master 1.3 are several statements by religious denominations, cultural traditions or tradition leaders, and individual scientists concerning science in general and evolution in particular. Read the statements and answer the following questions.

1. Which statements adopt a conflict, a separation, or an interaction approach to science and religion?
2. Which ways of knowing might religious and cultural traditions draw from?
3. Which ways of knowing are likely most important to a religious tradition that does not accept the theory of evolution?
4. Which way of knowing is the theory of evolution derived from?



Master 1.3:

Answer Key

Statement 1

“We the undersigned, ... believe that the timeless truths of the Bible and the discoveries of modern science may comfortably coexist. We believe that the theory of evolution is a foundational scientific truth, one that has stood up to rigorous scrutiny and upon which much of human knowledge and achievement rest. ... We ask that science remain science and that religion remain religion, two very different, but complementary, forms of truth.”

Answer: *Separation approach*

Source: *Clergy Letter Project (2007)*

Master 1.3:

Answer Key

Statement 2

““[Our community] believes, teaches and confesses that Adam and Eve were real historic individuals and that the Genesis account of Creation is true and factual, not merely a ‘myth’ or a ‘story’ made up to explain the origin of all things.

... Many aspects of evolutionary theory are directly contradictory to God’s Word. Evolution cannot be ‘baptized’ to make it compatible with [our] faith.”

Answer: *Conflict approach*

Source: *The Lutheran Church–Missouri Synod, Dr. A. L. Barry, former president (2001)*

Master 1.3:

Answer Key

Statement 3

“Since the sixteenth century [we] have described [our] faith in terms of the ‘three-legged stool’ of Scripture, Tradition and Reason. The quest to understand the origins of life on earth, and the forces that drive the ongoing changes in living organisms involves Reason and is in no way incompatible with the central truths of Scripture and [our] Tradition. [We] generally accept that it is appropriate to seek to understand, through scientific probing, the origins both of the cosmos and life on earth, and that evolution is a valid explanation of the development of all living things, including humanity. Several leading [thinkers in our community] have shown how an evolutionary world view can be integrated with a theology of creation. The 67th General Convention affirmed a belief ‘in the glorious ability of God to create in any manner’, and its ‘support of scientists, educators, and theologians in the search for truth’ (GC Resolution 1982-D090).”

Answer: *Interaction approach*

Source: *Episcopal Church, General Convention (2006)*



Master 1.3:

Answer Key

Statement 4

“Concerning the origin and historical diversity of life on earth, [we] accept the fact of evolution as the essential framework of modern biology. ...

... Religious beliefs in a personal god, human immortality, and a divine destiny for our species are inadmissible as scientific statements. And questions concerning metaphysics, epistemology, ethics and values are best answered in terms of science, reason and human experience within a secular framework and a naturalist worldview.”

Answer: *Conflict approach*

Source: *Council for Democratic and Secular Humanism (1994)*



Master 1.3:

Answer Key

Statement 5

“[We affirm] the idea that God is the Creator of the Universe and the Being responsible for the presence of human beings in this world.

Nonetheless, there have long been different schools of thought within [our community] regarding the extent of divine intervention in natural processes. One respected view ... [is] that ‘we should endeavor to integrate [our religious text] with rational thought, affirming that events take place in accordance with the natural order wherever possible.’”

Answer: *Interaction approach*

Source: *Rabbinical Council of America (2005)*



Master 1.3:

Answer Key

Statement 6

“Both [our tradition] and science prefer to account for the evolution and emergence of the cosmos and life in terms of the complex interrelations of the neutral laws of cause and effect. ... This means that, in [our tradition’s] investigation of reality, at least in principle, empirical evidence should triumph over scriptural authority, no matter how deeply venerated a scripture may be. ... Because of this methodological standpoint, I have often remarked to my ... colleagues that the empirically verified insights of modern cosmology and astronomy must compel us now to modify, or in some cases reject, many aspects of traditional cosmology as found in [our] ancient texts.”

Answer: *Interaction approach*

Source: *Tenzin Gyatso, 14th Dalai Lama, Tibetan Buddhist (2005)*



Master 1.3:

Answer Key

Statement 7

“Science enables us to understand the laws and principles by which the universe is constructed, its functions, and that is no trivial accomplishment. But there is always the question of meaning.

... In [our tradition], fortunately, there was a clear understanding of what constitutes religious knowledge inside experience on the one hand and what may be called intellectual, analytical, secular knowledge. This distinction is much more clear, it seems to me in [our tradition], which is why we don't have this kind of conflict [between science and religion].”

Answer: *Separation approach*

Source: *Varadaraja V. Raman, Hindu physicist (2007)*



Master 1.3:

Answer Key

Statement 8

“Let there be no doubt that as they are currently practiced, there is no common ground between science and religion. ... The claims of science rely on experimental verification, while the claims of religions rely on faith. These are irreconcilable approaches to knowing, which ensures an eternity of debate wherever and whenever the two camps meet. Although just as in hostage negotiations, it’s probably best to keep both sides talking to each other.”

Answer: *Conflict approach*

Source: *Neil deGrasse Tyson, astrophysicist (2007)*



Master 1.3:

Answer Key

Statement 9

“I think there’s a common assumption that you cannot both be a rigorous, show-me-the-data scientist and a person who believes in a personal God. I would like to say that from my perspective that assumption is incorrect; that, in fact, these two areas are entirely compatible and not only can exist within the same person, but can exist in a very synthetic way, and not in a compartmentalized way. ... Science is the way—a powerful way, indeed—to study the natural world. Science is not particularly effective—in fact, it’s rather ineffective—in making commentary about the supernatural world. Both worlds, for me, are quite real and quite important. They are investigated in different ways. They coexist. They illuminate each other.”

Answer: *Interaction approach*

Source: *Francis Collins, physician and geneticist (2000)*



Master 1.4: (homework)

Evolution as a Tool to Understand and Address Human Biological Challenges

Listed on CRS Master 1.4, taken from newspaper headlines and science research journals, are three examples of scientists using evolution as a tool to address and understand human biological challenges. The question that scientists are trying to answer is listed for each example. For each example, list the type of data scientists are collecting.



Master 1.4: Answer Key

Example 1: Adaptation to Altitude

“Quick evolution helps Tibetans at high altitude” (Rachel Bernstein, Los Angeles Times, July 12, 2010)
“Tibetans’ Ability to Live at 13,000 Feet ... New research adds Tibetans to the list of humans who have evolved in the modern era.” (Brian Resnick, Popular Mechanics, July 13, 2010)

What’s the story?

Answer: Scientists are using the theory of evolution to answer the question, “How did the ability to live at high altitude develop in Tibetans?”

What type of data are scientists collecting to answer this question?

Answer: The physiological traits of both Tibetans and those people who live closer to sea level; archaeological and genetic data that provide information on whom Tibetans descended from.

Activity 1: Teacher Feedback

Field tested with 5 schools - CA, CO, CT, NY, VA

10. Please use the space below for anything else you would like to tell us about your experience using either or both of these activities.

This was the first time I have taken class time to address the question, "Why Study evolution?" In years past, I took for granted that everyone would be on board, & if they were not there was not much I could do about it.

I appreciate the way this structured lesson helped me slow down & acknowledge that certain people have doubts about the evidence for evolution. Those doubts should not have to be muffled. There is space for such dialogue, without diminishing the significance of evolution to the study of biology.

Activity 1: Student Feedback Themes

1. curiosity about relationship of science and religion, desire to see compatibility
2. thoughts about appropriateness for science classroom
3. common misconceptions



Activity 1: Student Feedback Themes

1. curiosity about relationship of science and religion, desire to see compatibility

“It just kind of brought you to think about what your views on evolution are because I’m pretty devoutly religious. It was interesting to think about like, how my beliefs can mesh with evolution and I could still believe in science.”



Activity 1: Student Feedback Themes

2. thoughts about appropriateness for science classroom

“I really like how the lessons ease you into evolution, the idea of it, because most people are not open to learning it, so it’s kind of helping you not have to be bombarded...”



Classroom Activities

- Activity 2: “A Historical Role Play: How Do People Think About Evolutionary Theory?”

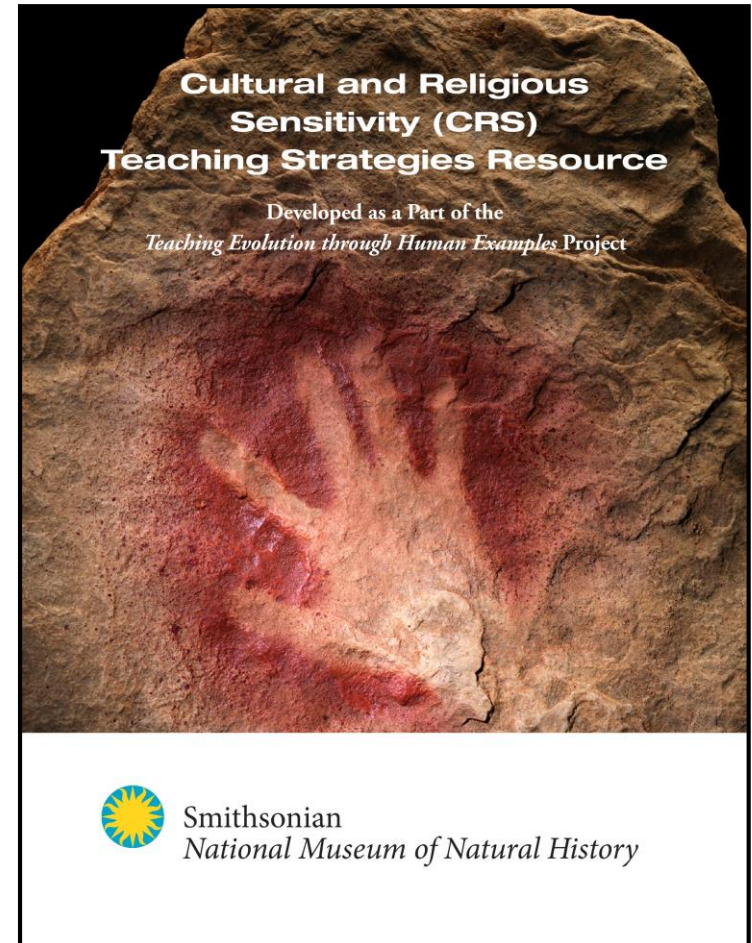
When? after evolution curriculum unit

Where? in areas with low resistance to learning evolution

Why? recognize variety of responses to Origin of Species;
use understanding of nature of science and modern
evolutionary theory to address characters’ concerns

Student Exercises:

- | | |
|-------------------|--|
| <i>Master 2.1</i> | <i>Historical Character Sketches (hmk)</i> |
| <i>Master 2.2</i> | <i>Responses from Proponents of Evolution</i> |
| <i>Master 2.3</i> | <i>Relating Science to Other Ways of Knowing (hmk)</i> |



Evolving Ideas: Who Was Charles Darwin?

<http://www.teachersdomain.org/resource/tdc02.sci.life.evo.dar/>

As you watch the video, think about the following questions.

1. What was the greatest mystery of biology in Darwin's day?
2. What did Darwin think about the similarities of structures among organisms?
3. What challenges did Darwin expect to face when he published his theory?

Master 2.1:

Historical Character Sketches

Form a group with the other students in your class who were assigned the same historical character sketch.

Charles Darwin

William Thomson (later Lord Kelvin)

Thomas Henry Huxley

Samuel Wilberforce, Bishop of Oxford

Leonard Smith

Eliza Wilkins

Asa Gray

Admiral Robert FitzRoy



Master 2.1:

Historical Character Sketches

Share the answers you suggested for your character with others in your group and then work together to draft a single response to each of the character's questions.

Choose one member of your group to later report, in character, the answers to the questions.



Master 2.1:

Historical Character Sketches

Form four paired character groups. Each paired group contains one character who supports Darwin's theory and one who is either opposed to or misunderstands the theory.

Charles Darwin / William Thomson (later Lord Kelvin)

Thomas Henry Huxley / Samuel Wilberforce, Bishop of Oxford

Leonard Smith/ Eliza Wilkins

Asa Gray/ Admiral Robert FitzRoy



Master 2.1:

Historical Character Sketches

Interview each other's character using the questions provided in CRS Master 2.1.

The two students chosen to play the characters respond by providing the answers their group drafted for their character.



Master 2.2:

Responses from Proponents of Evolution

In this activity, you will work together as a group to consider how the proponent of evolution in each pair might have responded to his or her colleague or peer.

As a first attempt, restrict your character's answer to a 19th-century scientific understanding of nature.

As a second attempt, allow your character to respond using a modern understanding of evolutionary theory. If possible, draw from the evolution lessons you have previously completed.



Master 2.2:

Responses from Proponents of Evolution

Use the following questions as a guide to drafting the 19th-century and modern-day responses.

1. Which character is a proponent of evolution? Or if both are proponents, which has an understanding of evolution closest to that of Darwin's?
2. Given the opposing character's specific objection(s) or misconception(s) about the theory, should the responses include references to the nature of science? For example, should the responses discuss the type of questions that science is able to explore? Why or why not?
3. If the opposing character's objection(s) depend on a 19th-century understanding of nature, what type of new evidence would the proponent of evolution need to answer the objection(s) or misconception(s)?
4. What insights from a modern understanding of evolutionary theory or earth history would help the proponent of evolution respond to the character's objection(s) or misconception(s)?



Master 2.2:

Responses from Proponents of Evolution

Briefly introduce your group's character pair to the rest of the class.

Describe the concern or misunderstanding one of the characters expressed.

How might the other character have responded—both historically and also having the benefit of a modern understanding of evolution?



Master 2.3:

Relating Science to Other Ways of Knowing

Religious and cultural traditions, as well as the individual members of these traditions, vary in which ways of knowing they emphasize when thinking about the world. They also vary in their approach to science in general and the theory of evolution in particular. Generally, one of three approaches to relating science to religion is practiced.

Conflict, separation, or interaction



CRS Activity 2: Student Feedback Themes

Field tested with 3 schools - CA, MD, UT

1. both concern and excitement about “debate”
2. interest in understanding how others’ views are formed
3. connection to previous work



CRS Activity 2: Student Feedback Themes

1. both concern and excitement about “debate”

“I was a little concerned at first because I knew a little bit of background about this debate and I knew it would have a lot of religion in it and I’m religious myself so I was a little worried about people bashing my views, but it didn’t really get to that so I was happy.”



CRS Activity 2: Student Feedback Themes

2. interest in understanding how others' views are formed

“It was interesting to have to defend a point of view that you might not agree with in your everyday opinions. It just makes you think about the different views and like how you could like see how that could work but from the modern standpoint that we had to do, how it could be wrong.”



CRS Activity 2: Student Feedback Themes

3. connection to previous work

“I considered it a little bit of a capstone because we learned about evolution and then we had to put in what our current response would be to theirs so we had to formulate our own kind of argument based on what we have already learned...”

