



TH3-611 Classroom Ideas which Blend Faith and Science

Faith & Science – Friends, not Foes! How Can “Religious” Look in a Science Classroom?
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How does one make faith-based, informed decisions? How do we eliminate misconceptions with science? With our faith? How do you deliver information to welcome safe conversation without judgement but to aim for Truth using their faith/moral/ethical compass? How do you foster spirituality in a science classroom?

Ideas for Biology

<u>Hierarchy of Life</u>	<u>Prayer Ideas</u>	<u>Areas of Misconception, which need Clarification</u>	<u>Value-Based Topics</u>	<u>Resources/Activities which go Beyond Content and Force Students to Examine their Moral Compass and Make Moral/Ethical Decisions</u>
Class Introduction	Getting to know students: Ask students for petitions – “For whom shall we pray?” For ethical and moral decision-making To Know Him, To Love Him, To Serve Him Generosity Prayer	Science v. Faith Scientific Dogma v. Religious Dogma Scientific Theory v. Popular notion of a Theory What Information is “real”? Bioethics Ethics v. Morality	<ul style="list-style-type: none"> • Grad-At-Grad in your curriculum/expectations • Biology of Life – the complexity of life (how can this be possible without God?) • Where was the biology in your world this summer? How did you experience biology today? 	<ul style="list-style-type: none"> • Students do questionnaire on the first day of their interests/concerns • Have students present a picture of the biology in their world this summer • Scientific Investigation on a Topic which is an important question to the student/to the school (ex. Energy usage or Recycling, Bacterial Population on the drinking fountain handles)
Atoms	For those undergoing chemo and	Radioactivity does not “glow” nor does it necessarily result in deleterious mutations	<ul style="list-style-type: none"> • Atomic bomb • Dumping of radioactive waste 	<ul style="list-style-type: none"> • Westlake Landfill http://westlakelandfill.com/history • Youtube video Times Beach Disaster

Atoms (cont.)	radiation treatment		<ul style="list-style-type: none"> • What is our responsibility? 	
Molecules	<p>For the poor For those who suffer from genetic disorders For empathy for those suffering from Down's syndrome For those imprisoned and loved ones of those in prison Generosity Prayer</p>	<p>There are malnourished people in our area/country; in our school (some can't afford to buy lunch) Why do people who are malnourished look "fat"? If the "end" is good, then does the "means" matter? "Organic" ≠ Healthier "Genetically-engineered" ≠ Bad There is no genetic basis for "race" There are many factors besides our genes which determine gender identity. A person is born homosexual and does not "choose" to be. Nature v. Nurture</p>	<ul style="list-style-type: none"> • Importance of molecular shape on function – drug development • Macromolecules as nutrition • Feeding the world • Distribution of nutrients • Ethics of nutrition labels • Development of Biodegradable materials; synthetics – impact on the environment? • DNA technology • Genetically engineered plants/animals • Inappropriateness of the word "retarded" • Genetics of race (is there a genetic delineation of race?) • Gender identity • Sexual orientation • What "causes" homosexuality? Scientific basis and the "grey" areas of Catholic teaching. 	<ul style="list-style-type: none"> • Research on how to feed the poor (peanut butter, nutrient-rich foods) • Eugenics • Watch and reflect on GATTACA • Selecting for traits in your babies • Origins of Abortion • Bioethics of CRISPR • Research on genetic disorders and genetic engineering • Should a line be drawn in gene technologies? If so, where? • DNA profiling and other biometrics; issues of privacy • Research on individuals wrongfully convicted and incarcerated but freed as a result of DNA fingerprinting (The Innocence Project) • Videos on the Genetics of Race • Race, gender identity and orientation biases (Is there a genetic basis? How does God call us to respond?) • "Junk DNA" makes up less than 1% of our DNA. The rest is the same. We are more alike than different. We are all a part of the human race. • How do we address our own biases? Understanding other perspectives and lenses and generating empathy. Do right-handers care about scissors? Pencil on their hands? Sides of a school desk? Are you aware of your gender at this school? What if you walked into an all-girls' school?
(segue to the components of life)	<p>Gratitude for Life "For what are we thankful?" Generosity Prayer</p>	<p>Faith does not "dumb down" science and science does not diminish faith.</p>	<ul style="list-style-type: none"> • Does Life make sense without God? • Does it make sense to go from random to complex order without God? • The Big Bang 	<ul style="list-style-type: none"> • Cosmic Origins: The Scientific Evidence for Creation by Fr. Robert Spitzer SJ DVD and reflection
Organelles	<p>For those suffering from organelle or</p>	<p>Endosymbiotic theory – origin of organelles Scientific definition of a theory</p>	<ul style="list-style-type: none"> • How did we go from nonlife to life without God? 	<ul style="list-style-type: none"> • Asbestos and lysosomal disorders (are companies obligated to treat mesothelioma patients?) • Case studies of metabolic disorders

Organelles (cont.)	metabolic disorders Generosity Prayer	Evolution and Catholic Church agree that diversity of life happened over a long time.	<ul style="list-style-type: none"> • How did the diversity of living things come into existence? 	
Cells	For those suffering from cancer For those suffering from infertility For those suffering from difficult or crisis pregnancies Hail Mary	Catholics are not against all stem cell research Men can get breast cancer. Contraceptives ≠ Abortifacients (misusage of terms) Catholic teaching on contraception, in-vitro fertilization, cloning, abortion NFP = Pregnancy People don't "become" gay. It is not their choice.	<ul style="list-style-type: none"> • Stem cells and cloning • What types of treatments are used to treat cancer patients? • Should you support causes that fund practices against your beliefs (e.g. abortions, embryonic stem cell research) • When does life begin? How does this gel with your belief system? • Premarital sex, contraception, the morning-after pill, sexually-transmitted disease, intimacy v. the act, respect for self and others, use of objectifying words • Determinants of gender and sexual orientation; use of the word "gay" as derogatory 	<ul style="list-style-type: none"> • Moodle survey or Quizziz of perceptions on Catholic Church Teaching on and the science of stem cells and cloning before cover the scientific material; have students take it again after material is covered to eliminate misconceptions • How far would you go to treat a loved one suffering from cancer? • Interview a loved one suffering from cancer regarding their treatments and how each specific treatment stops the cell cycle or other side effects • Class discussion, discussion boards and reflection sheets on reproductive issues • Watched PBS "The Miracle of Life" then discussed the Heartbeat Bill, abortion procedures, late-term abortions and had a class discussion • Baseball coach took players/students to watch "Unplanned" • Thoughts/research on forced sterilization; ok to use this to control populations? • Does gender identity and sexual orientation have a genetic component? What are the determinants? How do you proceed if you find you have same-sex attraction or if you find a friend does?
Tissues	For burn victims For our loved ones who are ill Generosity Prayer		<ul style="list-style-type: none"> • Tissue culture 	<ul style="list-style-type: none"> • Catholic teaching on tissue and organ donations
Organs	For those who need an organ transplant Generosity Prayer	Catholics are not against organ/bod donation. Catholics are not against cremation	<ul style="list-style-type: none"> • Organ donation • Cremation • Growing whole organs in labs • Face transplants 	<ul style="list-style-type: none"> • Would you donate your organs? Your body? • Do you know someone who donated their organs? e.g. Bobby Christman's heart • Discussion of the illegal organ trade/illegal harvesting in India

<p>Organs (cont.)</p>		<p>unless the intent is to desecrate.</p>	<ul style="list-style-type: none"> • Illegal organ donations/illegal organ trade • Prioritizing who receives the needed organ 	<ul style="list-style-type: none"> • Disparity in prioritizing who receives a needed organ transplant first
<p>Organ Systems</p>	<p>Petitions: For those who ill and their caregivers For those suffering from a particular ailment – depending on the organ system we are covering For those suffering from chronic illness For those suffering from anxiety and depression For those suffering from addiction and their loved ones Generosity Prayer</p>	<p>Perception that student who misses a lot of classes is “skipping” when they could be suffering from a chronic physical disorder such as migraines or Crohn’s, anxiety, depression</p> <p><u>Reproductive System:</u> See “Molecules” (DNA and Genetics) and “Cells” above</p> <p><u>Nervous System:</u> Mental illness is a true illness and does not follow “logic” rules. Addicts cannot just quit. It is dangerous for chronic alcoholics to quit cold turkey. Pot is less harmful than alcohol. Juhling/vaping rather than smoking nicotine does not cause any damage. Only old people get dementia.</p> <p><u>Endocrine System:</u> The existence and effect of environmental hormones</p>	<ul style="list-style-type: none"> • Disparity for medical care • Euthanasia • Is it ethical to use fetal pigs or euthanized cats from the pound for dissection? • Is it ethical to dissect for purposes of science? <p><u>Nervous System:</u></p> <ul style="list-style-type: none"> • Should marijuana be legalized? • What are your thoughts on curbing the opioid epidemic? • Is Juuling bad for you? What are the ethical practices of marketers to children and teenagers? Would these marketing practices compromise the dissemination of the science behind adverse affects? What is their responsibility? • What are the coaches’ and parents’ responsibility when is comes to a concussion suffered in sports? <p><u>Endocrine System:</u></p> <ul style="list-style-type: none"> • Hormone replacement • Anabolic steroid use to enhance sports performance 	<ul style="list-style-type: none"> • Disparity in medical care; what is our obligation to care for the poor? • What does it mean to “die”? • What is Catholic teaching on euthanasia? • Watched “The Passion” during Lent (just before students went to Easter Break) and often at the end of their autopsy • Alternative autopsy: during Lent, students who did not want to dissect a pig for a fetal pig autopsy report wrote up an “Autopsy of Jesus Christ”. They did historical research, examined a <i>JAMA</i> article “On the Death of Jesus Christ” and wrote an external and internal exam, including autopsy figures of Jesus Christ as a medical examiner would have reported after Jesus died on the cross, before He was laid in the tomb. The report was to be in the same format as a real autopsy report. • Made it a point to say to the guys during dissection as they collected their intestinal contents: “Hey, you are being so Open To Growth!” As they worked collaboratively in lab or discussion groups: “You are being so Loving today!” As I reminded them of the fact they are trying to let the body tell them what happened: “You are so Committed to Justice!” • Stories of real-world malpractice: carving initials in C-section incision; using own sperm for in vitro, unnecessary surgeries to support an expensive lifestyle <p><u>Nervous System:</u></p> <ul style="list-style-type: none"> • Movie set in St. Louis: An Anatomy of An Overdose https://www.youtube.com/watch?v=7E-JO5bUFec • Students researched the adverse effects of a street drug, why it’s a problem and generated and presented 1. a rap or podcast on drug prevention and 2. a drug prevention pamphlet for that drug • What is our responsibility to the elderly? • Movie “Alive Inside” on the effects of music on memory of dementia patients. Students then went home and interviewed a grandparent or parent asking what their playlist was containing music tied to a strong memory. Students then generated their own playlist. • Watched Documentary Frontline: League of Denial https://www.youtube.com/watch?v=DwVm_9Sfv2I&list=PL_pPc6-

<p>Organ Systems (cont.)</p>		<p>Anabolic steroids ≠ Cortical steroids <u>Circulatory System:</u> You can donate whole blood, blood cells, plasma or platelets. <u>Immune System:</u> Diseases are not always infectious. Some diseases are acquired through inheritance or a combination of inheritance and environmental factors.</p>	<ul style="list-style-type: none"> • Creatine, testosterone, growth hormone uses in sports – Is there a safe way to use them? What are the adverse affects? <p><u>Circulatory System:</u></p> <ul style="list-style-type: none"> • Blood donation – is it safe? <p><u>Immune System:</u></p> <ul style="list-style-type: none"> • Community-immunity • Forced vaccinations • Quarantines 	<p>gR9ZzT0z2OrNm0GvN6n0yyrsiz&index=3&t=8s and submitted a reflection on the ethics of the NFL in medical reporting of chronic traumatic encephalopathy</p> <p><u>Endocrine System:</u></p> <ul style="list-style-type: none"> • Watched National Geographic The Science of Steroids https://www.youtube.com/watch?v=EKWaJ_7PPXE and completed a reflection. Why the need to use steroids to enhance performance? Based on the information, is it okay to use? Is there a difference between an adult and a teenager using it for sports? What are the adverse effects? <p><u>Circulatory System:</u></p> <ul style="list-style-type: none"> • Discussion of the safety of blood donations and requirements to donate; encourage donations for blood drives <p><u>Immune System:</u></p> <ul style="list-style-type: none"> • Should all be forced to be vaccinated even if it is against their religion if lack of immunizations reduces the community-immunity? • Should immunizations be provided to the poor? • Recent local news about a hospital firing of a nurse who refused to get a flu shot because it was against her religion– was this justified?
<p>Organisms</p>	<p>Our Father</p>		<ul style="list-style-type: none"> • What does it mean to be “human” and not an “animal”? 	<ul style="list-style-type: none"> • Making the distinction between humans and animals: humans impart value, respect, love, and follow a moral compass while animals are instinctual and act on urges
<p>Populations</p>	<p>For the poor and marginalized For Creation Generosity Prayer</p>	<p>Misunderstanding and misinterpretations of “Evolution” Creationism, Intelligent Design What IS the Catholic stance on evolution? Chance v. Providence How the term “survival of the fittest” can be misleading Ethics v. Morals</p>	<ul style="list-style-type: none"> • Human exponential growth; disparity between richer and poorer nations; disparity between the poor and the rich • Curbing population growth of certain populations • Distribution of resources • Threatened/endangered populations 	<ul style="list-style-type: none"> • Catholic teaching of evolution (science cannot explain all) • God in Creation; God in All Things – look at this amazing diversity of life! • Our interconnectedness • Do richer countries have an obligation to care for poor countries? • Is it ethical/moral to curb population growth when there are limited resources? If so, what are the ethical/moral ways to do so? • What is our obligation to threatened/endangered populations? • What about forced contraception?
<p>Communities</p>	<p>For peace in our world For Creation</p>		<ul style="list-style-type: none"> • Effect of one population on another • Conservation of threatened or endangered species 	<ul style="list-style-type: none"> • Our actions affect others and other things • Wanted Poster Project on an Invasive Species and it’s negative impact on populations. Currency was in the denomination of the country in which it is a problem. Poster addressed the impact on human populations.

Communities (cont.)	For the poor and marginalized For immigrants and those seeking refuge from violence Our Father		<ul style="list-style-type: none"> • Why care about biodiversity? 	<ul style="list-style-type: none"> • Should we care about conservation? “Saving the rainforests” might be good but maybe the people of the rainforests need to cut down the trees to feed their families. The issue is more complicated. What is the context and needs of the people? • What does Laudato Si and Catholic Social Teaching say about the poor, marginalized? What does Laudato Si and Catholic Social Teaching say about conversation and preservation? At what cost?
Ecosystems	The Ecological Examen For Creation For Those impacted by natural disasters	Regulated hunting and fishing helps to increase diversity. Hunters and fishermen tend to be lovers of nature. The current trend of increased CO ₂ in the atmosphere is a direct result of human activity. Global warming is a real event.	<ul style="list-style-type: none"> • Effects of pollution? • Worth it to recycle? • Interdependence of nature and the nonliving components • Hunting and fishing – is it bad? • If the US reduces their carbon footprint and other countries don't, will it matter? • Fertilizer use vs. organic or bio farming • Fertilizer impact on the nitrogen cycle and algal blooms 	<ul style="list-style-type: none"> • Do we have an obligation to preserve ecosystems? • What does Laudato Si/ Catholic Social Teaching say about environmental stewardship? • Discussion of human impact on habitat? What is our obligation? • Do we have an obligation for environmental stewardship? • Sustainability Clubs/Committees – recycling audits, energy usage data, recyclable materials in the cafeteria, better signage on what can be recycled, refillable water containers, school-wide initiatives • WEB-based interactives on the nonliving/living components of an ecosystem and impact on each other as variables are changed • Discussion of hunting/fishing seasons and types of regulations to enhance the diversity in the ecosystem
Biomes	For our world Ecological Examen	Our individual actions matter. I can make a difference.	<ul style="list-style-type: none"> • Human impact on climate and temperature which in turn impacts biomes 	<ul style="list-style-type: none"> • Do we have an obligation to preserve our biomes? • What does Laudato Si/ Catholic Social Teaching say about stewardship? •
Biosphere	For our world leaders and right decision-making Ecological Examen	Our individual actions matter. I can make a difference.	<ul style="list-style-type: none"> • The real problem of “space junk” • Effect of humans on planets 	<ul style="list-style-type: none"> • What is our obligation to our planet?

Ideas for Forensics

<u>Unit</u>	<u>Prayer Ideas</u>	<u>Value-Based Topics</u>	<u>Resources/Activities which go Beyond Content and Force Students to Examine their Moral Compass and Make Moral/Ethical Decisions</u>
Observation Skills	<p>For understanding of other perspectives For valuing another's story For humility that I don't hold all Truth Our Father</p>	<ul style="list-style-type: none"> • The natural workings of the brain result in biases and assumptions • Variant eyewitness accounts • Is there an obligation to report a crime? • Police bodycams necessary? • Can surveillance cameras be biased? • Rape is NOT a sexual act. It is a violent one. • Address the common, insensitive use of "he's raping me" for roughhousing • Capital punishment ok? • Death penalty for teenagers or the mentally ill 	<ul style="list-style-type: none"> • Watch "Brain Games: Remember This!" on the natural way the brain works resulting in bias and variant eyewitness accounts by well-intended people https://www.youtube.com/watch?v=l1g0RctovZI • Discuss Ferguson – what are both sides? Why the "Black Lives Matter" movement? What is the context? • Research a case from the Missouri Innocence Project. Why was the person wrongfully convicted? How do you compensate for lost years? How do you prevent this from happening again? • Jurisprudence In the News Project. Research a local, regional, national and international case. What are both sides to this story? What would the prosecution say about this case? What would the defense say? • Discussion on "consent" or "rape" Brett Kavanaugh hearings. What are the two sides? Note that what he is purported to do or say a long time ago as a college student is coming back to haunt him. Should you be held accountable as an adult for actions you have done as a teenager? • Does a rape victim have some responsibility in the rape if he/she is intoxicated? • capital punishment ≠ pro-life • Catholic stance on capital punishment • Role of maturity or mental illness in a death penalty sentence • Current trend to pronounce someone guilty before proving innocent – is that okay? Do you do this? • Current trend to shout down those who disagree with you and not listen – some truth in both sides
Forensic Pathology/Anthropology	<p>For those who live with violence For those who died a violent death and their families For those who were harmed by the pain of suicide Generosity Prayer</p>	<ul style="list-style-type: none"> • Awareness of and sensitivity to students who live with violence (in their homes, in their neighborhoods) • If someone commits murder, can he/she still go to heaven? 	<ul style="list-style-type: none"> • Catholic teaching on about murder and redemption? • Catholic teaching regarding mental illness, suicide and redemption? • Alternative autopsy: during Lent, students who did not want to dissect a pig for a fetal pig autopsy report wrote up an "Autopsy of Jesus Christ". They did historical research, examined a <i>JAMA</i> article "On the Death of Jesus Christ" and wrote an external and internal exam, including autopsy figures of Jesus Christ as a

<p>Forensic Pathology/Anthropology (cont.)</p>		<ul style="list-style-type: none"> • If someone commits suicide, can he/she still go to heaven? 	<p>medical examiner would have reported after Jesus died on the cross, before He was laid in the tomb. The report was to be in the same format as a real autopsy report.</p> <ul style="list-style-type: none"> • Made it a point to say to the guys during dissection as they collected their intestinal contents: "Hey, you are being so Open To Growth!" As they worked collaboratively in lab or discussion groups: "You are being so Loving today!" As I reminded them of the fact they are trying to let the body tell them what happened: "You are so Committed to Justice!"
<p>Forensic Toxicology</p>	<p>For those who suffer from addiction For those affected by drugs – the addicted, his/her loved ones Serenity Prayer</p>	<ul style="list-style-type: none"> • The overpopulation of the incarcerated due to drug convictions • The role of marketing by pharmaceutical companies in the opioid epidemic • The over-prescribing of opioid by physicians • The legalization of marijuana- an analogy to Prohibition? • Vaping is not harmful for you, is it? • The perception that alcohol is more harmful than pot • Can you get addicted to pot? 	<ul style="list-style-type: none"> • How do you best rehabilitate those incarcerated for drug convictions? Is there a better way? • The ethics of pharmaceutical companies marketing drugs • Debate over legalization of marijuana; are there parallels to Prohibition? • Watched the PBS American Experience documentary on "The Poisoner's Handbook" Do you see a pattern with big money and the downplaying of safety concerns with the chemicals the company is using/selling? https://www.youtube.com/watch?v=Mx6Zso2Eg6w • Debate over the safety of vaping in teenagers and the mixed messaging by marketers • Research on the effects of nicotine in Juhs • Research on addiction and pot • Students do their own research on a problem street drug and the adverse effects. The high school version of D.A.R.E. The issues are more relevant and the students "hear" better by figuring it out themselves than by preaching the "don't do drugs" message. • Drug canine demo
<p>Digital Forensics</p>	<p>For personal relationships For those who are lonely, bullied or oppressed For courage to reach out to those who are not like ourselves For courage to stand up for those who cannot Generosity Prayer</p>	<ul style="list-style-type: none"> • Posting on social media when before it was writing on a bathroom wall • Rights to privacy • Long-term accountability • Search histories, deleted files, text messages, Instagram, Snapchat posts can be retrieved • Information on refurbished phones can be retrieved 	<ul style="list-style-type: none"> • Guest speaker and alumnus in the cybersecurity field spoke to students the Friday before they went on spring break regarding their cell phone use, posting on social media (now it's fair game and no longer "private") and potential long-term consequences

Ideas Sometimes but Not Always Tied to Content but used in the Classroom due to the Month/Day

<u>Event</u>	<u>Prayer Ideas</u>	<u>Resources/Activities which go Beyond Content</u>
Class Mass Days		<ul style="list-style-type: none"> • Explain to those who are not Catholic what the Mass is all about • Catholics are Christians who believe in Jesus and the Mass celebrates the Incarnation of Christ • Remind/Tell students about the Celebration of the Eucharist and upperclassmen are modeling respect for those who want to pray
October and May– Month of Mary	Hail Mary	<ul style="list-style-type: none"> • Brief explanation before prayer why we celebrate the Blessed Mother
January – MLK February Black History Month	<p>For understanding of another perspective To Know Him, To Love Him, To Serve Him For those who suffer from persecution For those who feel marginalized and without a voice For the end to hate and violence</p>	<ul style="list-style-type: none"> • Watch the Smithsonian Documentary “MLK Assassination Tapes” • This gives students a context of why they are off for the long weekend. They see parallels to some of the recent events (e.g. Ferguson) happening today. Students do a reflection. What were the circumstances surrounding the assassination? What are parallels today? How do you proceed today? What is your take-home message from the documentary? • Students research a famous scientist of color and present to the class • Explore whether “race” is a genetic construct or a social one • Watch “The Genetics of Race” and do a reflection • Students had the option to sign up for an Ancestry DNA kit to determine their heritage and shared my results with the students • Another movie possibility: PBS America ReFramed “Gentlemen of Vision” set in St. Louis about how an inspirational teacher motivates students who are socioeconomically disadvantaged to succeed in school and in life https://www.pbs.org/video/gentlemen-of-vision-6upioz/
January – Pro-Life March	<p>For those who are in difficult or crisis pregnancies Hail Mary</p>	<ul style="list-style-type: none"> • Watched “The Miracle of Life” documentary and did a reflection (see Ideas in Biology under “Molecules”, “Cells” and “Organ Systems”) • Diaper collection, Baby items to donate to Birthright, Legatus other Catholic agencies which collect for pregnant mothers in need • Watch and reflect on “Unplanned”
March – Women’s History Month	<p>In gratitude for the women in our lives For women in the world who suffer oppression or violence For understanding of a different perspective For the intercession of the Blessed Mother Hail Mary</p>	<ul style="list-style-type: none"> • Students research women scientists and do a presentation • Before prayer conversation about respect for women and inappropriate words to describe women • Discuss that rape is violent and not sexual • Conversation about women experience at an all-boys school is different

March – Women’s History Month (cont.)		
February-March Lent	<p>For growth in our daily struggles For those who are suffering who are closest to the Passion of Jesus that they may feel the comfort in the love of Christ For the sake of His sorrowful Passion, have mercy on us and the whole world Show The Passion of the Christ prayer video https://www.youtube.com/watch?v=IL4m3wgg2gk</p>	<ul style="list-style-type: none"> • Watch “The Passion of the Christ” • Or if not enough time, show this video before Easter break as the prayer https://www.youtube.com/watch?v=IL4m3wgg2gk