

## Artificial Intelligence: A Modern Creation Story

Curriculum Unit 19.01.05  
by Barbara A. Sasso

### Introduction

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*The Creation of Adam, 1508-1512, Michelangelo*

*"What a piece of work is a man! How noble in reason, how infinite in faculties, in form and moving how express and admirable, in action how like an angel, in apprehension, how like a god! The beauty of the world, the paragon of animals!"*



*Cuevas de las Manos, in Argentina. The art is between 13,000 and 9,000 years old.*

The questions arise in religious teachings, and in myth and fantasy: Will our inevitable achievements lead our children to the Promised Land, or to a terrible apocalypse and annihilation of our species? With robots now patrolling the aisles of our supermarkets, with virtual assistants and computer algorithms aiding us in everything from shopping, to finding mates, to choosing what information we see on the internet, with technology offering virtual experiences, and with robotic assistants already appearing in hospitals and nursing homes, the question of how these new creations will shape our world is not academic. What indeed, hath we wrought? Humans are creatures of innovation and aspiration. It might well be that from the dawn of time, homo sapiens have seen themselves as nearly as powerful as gods, as children of the gods, as favored by the gods. And why not? The amazements of technological strides in the 21<sup>st</sup> century are certainly dazzling, but what about those of primitive people, a thousand years before the Vikings, who sailed thousands of miles across the open Pacific in very small and vulnerable catamarans, with no other navigational tools but the tides, the birds, the stars? We have become almost omnipotent on this planet. The devices almost all of us now hold in our hands give us access to near-omniscience. Will we reach next for the tree of immortality? Will we become so like the gods that we will create new creatures who will supersede us?

## Rationale

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I teach in an urban school in New Haven, Connecticut. Most of my students are minorities living below the poverty line. Many are refugees or from immigrant families. Our school is open and welcoming to students who identify as LGBTQ, and it educates severely disabled students. Due to our location close to Yale University, we also have a small population of affluent student from academically enriched backgrounds. This unique environment often reveals a generous human capacity for empathy, although the greater world is not so inclusive.

Many dystopian visions of the future follow themes of violent conflicts with “the other” in the form of robots or genetically-superior humans. In my school, there are many students who, by race or immigration status, are outsiders in American society, and the treatment of the Creature in *Frankenstein* – indeed the mistreatment of robots in many science fiction stories – is relevant to the often brutal treatment of “others”. What makes us human, and what will become of us when we create new forms of intelligent life? Even if the robots don’t destroy us, will our own lives become completely irrelevant? Many of our virtual assistants, programmed by men, have female voices. Does this amplify gender bias? If we treat our virtual assistants as slaves, will this increase our hatred towards other humans?

## Unit Overview and Objectives

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My unit will align with Mary Shelley’s *Frankenstein* for Advanced Placement Literature students, although it could also be adapted to other texts that pose the same questions: Will we be cautious creating technology, or will our creations ultimately harm us? When we create more beautiful, more intelligent, and more talented humanoid entities to obey us, to think for us, to entice us, and to comfort us, will this diminish how we view

other people, and ourselves? I hope this unit will encourage students to be mindful of technology they use, feel agency in determining its future, and strive towards building a more humane world.

The unit will incorporate reading and discussion of *Frankenstein*, and include research and discussions on moral and philosophical issues in the development of modern intelligent robots, research on 18<sup>th</sup> century social and historical developments that shaped Mary Shelley's novel, reading and discussion on the implicit warnings in creation stories from Greek mythology and the Bible, and creating a vision of life fifty years in the future.

Students will first research robotic or virtual entities already existing. How are their phones and virtual assistants affecting their daily lives, and the way they view other people? What might the future be like as the powers of these virtual assistants advance? What other kinds of robotic assistants and genetic-altering technologies already exist in our world? Students will choose a developing technology to research, and consider how it might affect their lives in coming years.

Students begin reading *Frankenstein* with questions that consider Victor Frankenstein's motivation in creating a human in a lab, why this new creature evokes such a violent response from the people in Victor's world, and what the novel's warning is for scientific endeavors. How might this story relate to the development of current artificially-intelligent technologies?

As they read at home, we will explore two different pasts in class: Mary's Shelley's historical past at the revolutionary transition from the Age of Enlightenment to the Industrial Revolution, and mythological pasts that tell the story of human creation. Both of these will tie into a main theme of the unit: We must take care in how we use our impressive creative powers. Students will have supplemental readings to prepare for these discussions.

The next part of the unit will a class discussion of science fiction stories and films, which often depict violent conflicts between robots and humans, often instigated by human brutality. What responsibilities do humans play? Can we avoid this chaos?

Isaac Neal, a computer engineering student and friend, spoke to me recently about something called "the uncanny valley".<sup>1</sup> This is a psychological term to describe what happens when a humanoid figure is almost, but not quite real. We accept a figure that is *obviously* a robot: the *Star Wars* robots, the robot in *Lost in Space*, and *The Hitchhiker's Guide to the Galaxy*. But when a robot is verging on human, but creepily false? At this point, humans react with violence and revulsion. This is what computer engineers believe will keep real humanoid robots from existing in our near futures, since bridging that uncanny valley is at the moment an engineering impossibility. Is the uncanny valley also a form of tribalism and innate racism? If it is a primitive code, can we overcome it, or rewrite it in our future genome?

Isaac has also worked as a model, and I mentioned an article in *The New York Times* about Lil Miquela, a virtual influencer<sup>2</sup> who works with Prada, gives interviews from Coachella, and kissed a real supermodel in a Calvin Klein commercial. She has over a million followers, though she does not exist. Isaac noted that *virtual* entities that are *not* robots are often accepted as human. And apparently, are putting him out of work. "I'm aging out of that market anyway," he noted. He is only twenty-one.

And that in itself brings up the following issue:

Works that depict robot apocalypses reveal the flaws in humans who created them. This is an important

theme in Mary Shelley's *Frankenstein*. In E.M. Forester's story, *The Machine Stops*, the character Kuno exclaims, "Man is the measure." Ultimately, whatever good or evil that comes from our inventions was placed there by *us*. The robots are really immaterial. If a twenty-one-year-old former model is now too old to work, what kind of world have we already created?

I want to inspire students to realize that they have agency in choosing the kinds of technology they use, and in enacting laws governing this technology. I would like them to consider how their futures will be affected by the technology that is already at their fingertips, in their homes, in their stores, in their dreams. What happens to *them* when they outsource their relationships, their memory, and give up their fulfilling labors to their machines? I would like students to see that the future is engendered by who we are now, and how we treat one another.

Innovations come from dreams. At the end of the unit, I will ask my students to create short "dream vision" work. Science fiction is often set in the near-future, as a way to underscore how close the transformation is. In this assignments, students will travel ahead fifty years. What kinds of relationships are there among humans and the humanoid or genetically-modified entities that inhabit this world? My hope is that they will be inspired to shape innovations and legal boundaries necessary to bend transformational technology towards creating a utopian, rather than dystopian future.

## Mechanical or Genetic Engineering?

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In *Computing Machinery and Intelligence*, Alan Turing excludes "men born in the usual manner" from his essay on computer cognition. In today's world of science fiction, authors present an array of humanoid creatures: Some are cyborgs, that is, humans with mechanical parts that give them super-human capacities. Some are robots, or mostly mechanical machines. Some are mutants, or genetically-altered humans who are smarter, and stronger than we are. The creatures made by humans have brains, thoughts, and beauty that are biological imitations. Is there a point in quibbling about being randomly born, or created? Turing thought so.

This purposeful action is important in assessing our own failings, perhaps not so much in design, but in desires. The evil is not in the technology, but in the creator. The question isn't what we create, but to what purpose we use our creations, and more so, how these very inventions change us. The creature in Shelley's *Frankenstein* can be viewed as a metaphor for humanity's own corruption, and so it is with our own new inventions. We probably will not be attacked physically by them, but our lives are changed as we surrender our intellect, our human interactions, and our power to them.

Turing ultimately committed suicide because society in the 1950's condemned him for being homosexual. No one blamed God for Turing's sexual orientation. His essay suggests that in what he calls "The Imitation Game" we couldn't tell the difference between a machine and a human, and he raises interesting questions about what it means to think, and what it means to be human. Interestingly, the essay begins with a contest to guess the difference between a man and a woman. Would it matter? I wonder if anyone would guess his sexual orientation. We already seem bent on blaming the machines for whatever curses they lay on us, but who created them? The fault is not in the machines, but in ourselves.

We are surely on the verge of a singularity in human existence at the dawn of CRISPr technology. Already, genetically-altered humans walk among us in this world, while virtual assistants are learning to speak with human nuances through artificial intelligence.<sup>3</sup>

The technologies of both mechanical and biological engineering exist today in one lab. My brilliant student, Sophie Edelstein, was a research associate in a bio-engineering lab run by Laura Niklason at Yale, where she helped engineer tracheas. She assured me that synthetic material is key to forming a scaffolding to grow biological materials that might be used someday to replace tracheas in people, and save lives. Sophie is herself a cyborg, as many of us today are. She was born with a condition that required her to have both of her hips replaced with synthetic materials before she was seventeen. It is likely that the humanoid robots of tomorrow, should we choose to create them, will have both synthetic and biological components. It is equally likely that the humans of tomorrow, should we choose to save them, will be cyborgs, with both synthetic and biological components, or have altered genomes, to make their lives better. In the near future, both humans whose lives are improved with genetic manipulations or implanted devices and somewhat humanoid robots created to assist us will inhabit the same world. How will we all fare is a reflection of who we are, and who we want to become.

And what to call them? The word *robot* is derived from a Czech word for slave<sup>4</sup> and it seems somewhat derogatory. Automaton evokes something purely mechanical and non-sentient. Will there be different words for all categories of humanoid entities, genetic, mechanical, or combinations of both, a kind of LGBTQ+ of other beings? Will gynecoid be added to android? Will humanoid be preferred? Perhaps Jason Silva's word, *transhuman*, will be in vogue.

## Robots and Genetically Altered Humans Are Here

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In this lesson, students either individually or in groups, will research current technology in robotics and genetic engineering. In class, they will present their findings for a general discussion. This research will later be used in their final projects for this unit.

The resource list at the end includes a number of videos and articles that profile state-of-the-art robots, and a variety of visions for robots in the near-future. These include Boston Dynamics's<sup>5</sup> spectacular work on robotic maneuvering, the creepy talking robot head Bina,<sup>6</sup> self-learning robots such as iCub,<sup>7</sup> a robotic news anchor,<sup>8</sup> and robots who help patients in nursing homes.<sup>9</sup> Capgemini, a global technology consulting firm, is now advertising empathetic virtual assistants.<sup>10</sup> Students also might read articles on biological engineering and genetic engineering. It is already possible to change the human genome to avoid genetic and pathological disorders, as was recently done in China to in-utero twins, so that they would not be susceptible to HIV.<sup>11</sup> Other spectacular, and controversial, technologies are in labs, such as one creating chimera animals to grow human organs genetically matched for a specific person.<sup>12</sup> Another lab can enhance the intellectual powers of your brain.<sup>13</sup> A good, short video to start with might be Jason Silva's *To Be Human Is to Be Transhuman*. Another would be *Machine Learning: Living in the Age of AI*, produced by Wired publications.



*Marty the Robot in Stop and Shop*

Students will also research how smart assistants might affect confidence, interactions with other humans, and brain power. What are the psychological effects of these technologies on humans, and on human bias? How will our treatment of robotic slaves affect the way we see ourselves and treat other humans? A number of studies reveal that unaccompanied minors often abuse robot assistants in stores.<sup>14</sup> Could we navigate our world without phones? How comfortable are we in asking another human being for assistance? What does this bode for the future, when virtual assistants might be doing many more things for us? Graphs that illustrate demise in teenage mental health with the advent of smart phones in Jean Twenge's book, *iGen* might be insightful. Anab Jain's TED Talk, *Why We Need to Imagine Different Futures* and the quiet feature film, *Robot and Frank*, are recommended to spark discussions on the world of the near future. Might we program robots to be *more* capable of compassion than humans? Sherry Turkle, researcher at M.I.T, wonders if "our relationships with robots makes us question the purpose of life itself."<sup>15</sup>



*Nao, in a Robotic Study at Yale*

What paths we decide to take is shaped by who we are now. It is important for students to consider the world of Mary Shelley, who also lived during a revolutionary time – not only of technology, but of human freedoms. *Frankenstein* explores not only the perils of technology, but bias relevant to her own era, by portraying the plight of a creature uncannily like ourselves.

## Mary Shelley's Historical and Personal Context

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Mary Shelley's famous novel is fully-titled: *Frankenstein: A Modern Prometheus*. Her novel was published in January of 1818, after experiencing the loss of one child with the poet Percy Bysshe Shelley, the suicide of her half-sister, Fanny, and the suicide of Percy Shelley's wife, Harriet. In the coming two years, Mary Shelley would lose two more children. In October of 1818, Percy Shelley would begin a verse play called *Prometheus Unbound*, which envisions a race of humans finally free of the bonds of the gods, empowered by love and community.

The story of the writing of the novel *Frankenstein* is a story in itself. In 1816, Mary Godwin, then nineteen years old, was the mistress of Percy Shelley. They went to Geneva with her half-sister Claire Clairmont and the poet, Lord Byron. Claire was pregnant with Byron's child, Ada. In June, Byron suggested that everyone write a ghost story.

Mary had met Percy Shelley because he was drawn to the Enlightenment political theories of her father, William Godwin, which expounded the advancement of humanity by abolishing economic and political restraints, such as the aristocracy, religion, government, and marriage. Mary's mother, Mary Wollstonecraft, published *A Vindication for the Rights of Men* (1790) preceding Thomas Paine's text, *The Rights of Man*, and *A Vindication for the Rights of Women* (1792). Both Mary Wollstonecraft and William Godwin were abolitionists and supported the French Revolution's declarations of human rights, including the abolition of slavery. Before marrying Godwin, Wollstonecraft barely escaped imprisonment in France during the Reign of Terror. She returned to England and married him after becoming pregnant with Mary, and died days after giving birth to her in 1797, a common tragedy before the advent of antibiotics.

There is an apocryphal story that Mary, at sixteen, became pregnant during a tryst with Shelley on her mother's grave. When it came to his daughter's entanglement with Percy Shelley, William Godwin lost his free-thinking moral compass, and both Mary and Percy left England in 1814. They passed through post-Revolutionary France, and witnessed the desolation the war had on the peasants. But both held fast to the beliefs espoused by William Godwin and Mary Wollstonecraft in the freedom and equality of all people.

In a strange footnote, Ada Byron, Mary Shelley's niece, would become renowned for an addendum she wrote in 1843 on a memoir about an "analytical engine" created by inventor Charles Babbage. Ada's mother Claire insisted she be educated only in math and science, to avoid the passions of her father. She proved to be a protégée. Her notes reveal her genius in understanding the potential power of a machine to think. Turing references her work, and credits her as a founder of scientific computing.

Why does any of this Romantic drama matter? Novels, like robots, are creatures endowed by the experiences and imaginations of their creators. Consider the losses she experienced, and the desire all of us have, to extend and perfect human life. Consider the revolutionary fervor of her times, as technological advancements of the Industrial Revolution were changing how people saw themselves, and expanded the ideals of personal freedoms for all humans. As they read about her life, students will discuss how Shelley's experiences permeate *Frankenstein*. Shelley's novel is an incredibly insightful warning about what might go wrong when human passions overcome human reason, and when our ideals ignore our human flaws.

When we are looking ahead to our own future creations, we must assess the values we hold that will shape our designs. Will our future creations be used for war, for peace, for the vanity of the wealthy, to sate our

desires, or to promote equality? What do we want of them? What will we think of ourselves in comparison to them? Will our superior creations tire of us and eliminate us? Will they confront an existential crisis of their own and eliminate themselves? Will we allow ourselves to be governed by machines? Who will control them?

This thought experiment begins, as many human truths do, in myth.

## The Creatures of Prometheus

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Each year, fewer students arrive with a good background in religion and mythology. Moral values aside, the study of myth and religion includes stories that are good allegories for human life and human nature, and can be profoundly enlightening in ways that have little to do with belief in God. A lack of knowledge in myth and religion also poses a serious barrier to understanding literature, music, art, history, law, and society through time.

When considering the advent of intelligent robots, the connection of human as creators to gods in myths is unsurprisingly stark. After all, we created these stories based on our own awareness of our considerable intellect and creative powers: We are creatures who can conceive of time before we were born, and time after we die, yet we are mortal. We are creatures who can conceive of an empowering implement that doesn't exist, and we create it out of our imaginations. We have language, and from this language and our memory, we pass down stories, art, discoveries, and continue to build on our knowledge. In short, we as a species seemingly have powers of omniscience, omnipotence, and immortality that we confer to our gods. Both the biblical story of Adam and Eve, dating about 2,600 hundred years ago, and the succession story in Hesiod's *Theogony* dating about 2,700 years ago, show gods creating intelligent creatures, who then strive to supplant them. Students will read these stories and prepare for class discussion.

Will our own new creatures one day supplant us?

Both stories provide warnings against our own awesome powers. By the time these stories were written, the human cultures that created them had effectively conquered their worlds. Both the Israelites and the Greeks had amassed vast empires. The Greeks were on the verge of a scientific and philosophical tsunami – and both societies are responsible for engendering the impressive civilizations of the Western Hemisphere. What hath God wrought, indeed? It is important that young people today take time to read these texts from a humanistic, if not a religious perspective. Both stories relate to *Frankenstein*, and both reveal insight into flaws in humanity that should inform our desire to create new beings.

### Prometheus

In the Greek story of the creation of humans, the Titan Prometheus makes humans in the image of the gods from clay, a decidedly inferior substance. They had heat in their blood and breath in their lungs, and with these contained the four elements from which the ancients believed all things were constructed: earth, air, fire, water. But Prometheus also incorporates “ether”, the fifth element, or “quintessence.” Ether is a pure, incorruptible substance, the material that made the gods and heavens. To be human, then, is to be both like the gods, and earthly, changeable, mutable, mercurial, and subject to death. The creatures made by Prometheus, and the biblical God, and the ones both Turing and Mary Shelley conceived in their works, were thus created. That is, a thinking creature put them together in a purposeful, not randomly biological, way,



imitating humans.

In many stories of origin, gods create creatures that then revolt and take over, not unlike our fears of robot revolts. In Greek mythology, a generation of gods came before Titans: the earth parents of Uranus and Gaia.

In Hesiod's *Theogony*, Uranus has allowed his children the Titans freedom, but imprisoned other children who threatened him – the Cyclops and monsters – inside Gaia. What woman would stand for this?



*The Birth of Venus, 1480, Sandro Botticelli*

Gaia engages the assistance of her son, the Titan Cronus, to render Uranus impotent, literally, by providing him with an adamantine sickle. When Cronus emasculates his father, Uranus becomes the docile sky. His genitals, tossed into the ocean, become Aphrodite. The power of women in this myth, written in a male-dominated society is not to be dismissed.

Cronus takes power. He and his sister-wife Rhea then give birth to the Olympian gods. But Cronos keeps the monsters and the Cyclops imprisoned, and wary of his own history, begins devouring his children with Rhea. Rhea takes a play from the past, and when she gives birth to Zeus, she hides him and hands Cronus a stone to swallow instead. When Zeus comes of age, a war between the Titans and the Olympian gods ensues. The children of the gods once again supersede their parents, and Zeus triumphs. (Hesiod, in *Works and Days*, references many races of humans being created and destroyed through ages.)

In Aeschylus' *Prometheus Bound*, Prometheus endows humans not only with fire, but with intellectual gifts as well: agriculture, medicine, and the creative arts. His goal was to create another generation that would counter the destructive powers of the Olympian gods, and bring the world around to a new Golden Age. Can humans achieve this?

For punishment, he is chained to a rock, visited daily by an eagle who eats out his liver, which regenerates, only to have the torment repeated. His savior will be Hercules, a son of Zeus, who in freeing Prometheus, will assure that the power of the gods is passed to humans.

Mary Shelley's novel is subtitled, *A Modern Prometheus*, since Victor Frankenstein creates an entity who seems destined to supplant humanity. Within the novel itself, the creature comes across John Milton's epic poem *Paradise Lost*, which retells the story of Adam and Eve as it appears in Genesis and the Qur'an. It is also as story of succession of power as the children of the creative god strive to attain divine powers.

## God, Satan, and Adam

In the past, when many more students attended outside religious classes, they knew well the story of Adam and Eve. They were often familiar with the story of the fallen angel, Lucifer. The Christians often believed that this was a story somewhere in the Old Testament, while the Jews thought that it must appear somewhere in the New Testament. More recently, when our sanctuary city began wondering if we should include Eid al-Fitr as one of our school holidays, the Muslim students were able to clarify the origins of the story of Lucifer or Satan, the fallen angel: It's in the Qur'an.

In Genesis, Adam and Eve are hunter gatherers, content in their role as alpha fauna in God's terrarium, the Garden of Eden. That is, until the snake comes along and tempts Eve to eat of the Tree of Knowledge of Good and Evil. God warned Adam that if he ate the fruit of this tree, he would die. But the snake tells Eve, no, this knowledge will not kill them – it will make them more like God. God has already endowed Adam with power over all the other creatures in Eden, and given him the gift of language to secure his power over the animals and plants. God breathed into Adam the breath of life, and gave him Eve as a helpmate, created not from mud, but from Adam's own flesh and bone. When God discovers their transgression, they are expelled from Eden with punishments before they can eat of the Tree of Immortality. But they retain their knowledge, and their free will. In this story the creations of God are seeking His powers. If they succeed in their journey outside of Eden, the promise is that they will regain Eden, a place where divine grace and human failings flourish in a balance.

The story in the Qur'an is also very interesting in that Allah does not forbid Adam and Eve from eating of the Tree of Knowledge, since for Muslims, knowledge is a gift. He forbids them from eating of the Tree of Immortality. Once they transgress, they are expelled with the punishment that immortality will only come after death. And, it is Satan, not humans, who are seeking to overthrow God. These distinctions are important: Seeking knowledge may not be the problem, but seeking powers beyond the scope of what is possible for humans will be the source of our undoing.

Milton's *Paradise Lost*, which Victor Frankenstein's creature reads as his intellect is awakened and he begins to discover himself, unleashes a very deep question of how our human limitations shape our humanity.

This lesson should also include for a discussion on gender bias, incorporating not only Even, but the Pandora myth, and the Pygmalion and Galatea myth, as it portrays an artist who carves the "perfect woman" out of ivory. When we create our "perfect companions" what will this do to human love?

## Reading and Discussing *Frankenstein*

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While we explore questions of myth, history and technology, students will be reading the novel with specific focus questions directed at questions of human hubris and innovation. This class discussion will begin after student read through Chapter 10, and focus first on Victor's desire to create human life. Where does he go wrong? For Chapters 10 through 24, students will consider Victor and his and society's reactions to the Creature, as he is called. How is he harmed by the humans around him? What is the novel's message about *humans*, perhaps more than our creations?

*Frankenstein* is famous not only for its prescient portrayal of what goes wrong with human technological

endeavors, especially in regard to changing the natural order of life, but also for its structure. The novel unfolds in three nested stories, sometimes called a “Chinese box” plot, with a fourth story embedded in the center. These different perspectives allow us to see what science writer Joey Eschrich, in an essay titled, *Why ‘Frankenstein’ Is a Great Science Policy Guide for the Future*, calls “a nuanced exploration of scientific ethics and the dynamic between scientific creativity and social responsibility”. He suggests that the novel be required for technological innovators as a warning: while innovation might have good intentions, humans lack foresight into the effects technology might wreak upon the world.

The outer frame in *Frankenstein* is written in letters from Robert Walton, a scientist and adventurer, whose boat is perilously trapped in the ice as he ventures forth to discover the North Pole. Victor Frankenstein, dying, and in pursuit of his Creature, is pulled on board and confesses his story of creating human life. The Creature then comes aboard, sees Victor’s corpse, and goes forth to die by self-immolation. The entire story is filtered through Walton, who in the end realizes the folly of his own quest. He turns his boat towards home, rather than risk the lives of all his men.

Although Walton is often the forgotten character in *Frankenstein*, his perspective and self-reflective letters to his sister are critical to understanding that one should question technological advances, and because we *can* does not mean that we *should*. Because humans, including Walton, often justify our endeavors as noble, it is critical to have serious independent consideration of the potential negative outcomes of our technology. Students should consider Walton’s true motivations in his quest to discover the North Pole, and should assess his decision to abandon this adventure, even though Victor, before he dies, urges him on. Why hasn’t Victor learned from his own obviously catastrophic error? What does this warn us about aspects of human nature?

The next circle of stories is Victor’s account, dictated and reworded by Walton, of his life and his obsessive desire to create human life in a lab after his mother’s death. Students should read carefully and assess Victor’s psychological drive, especially the problems that his obsession caused for himself and his family. While desiring to take control of issues concerning life and death might seem noble, what are some of Victor’s not-so-noble actions even before his creation is endowed with life? Questions regarding the secrecy of his actions, his rejecting the advice of professors, grave-robbing, the gruesome assembly of human parts, and his isolation from his family can be posed to students to spark discussions about how and why inventions are developed in our world. Should there be limits on what is created? Should consumers alone decide these limits?

In the late 18<sup>th</sup> century, Luigi Galvani had discovered that electricity could move the muscles of dead animals. He published a paper in 1791, claiming that electricity was likely a vital force of life. Although Mary Shelley had discussed if electricity might be used to extend life with her husband and Lord Byron,<sup>16</sup> when the Creature is endowed with life, she does *not* include an electrical storm as the spark. However, the power of electricity to destroy a *tree* does spark Victor’s desire to have control over destructive forces of nature, and later, after his creation has destroyed his family, he relates that he himself feels like this blasted tree. While humans generally revere life, we have a harder time understanding the value of death to maintain balance and create dynamic change in the natural world. Percy Shelley’s poem *Ode to the West Wind* acknowledges the incomprehensible power of the natural world, the force that is both “destroyer and preserver” and Mary Shelley’s *Frankenstein* mirrors this conflict as well. What happens to Victor when his Creature is animate?

Students will be encouraged to consider human psychology at work in Victor: Why does he reject his creation, and flee from it in revulsion? What happens to him, emotionally and why? Why doesn’t he seek help in finding the creature he has unleashed into the world, but rather retreats into a kind of tormented denial – even when

the Creature kills his own brother? Why does he retreat into his own “madness” to allow Justine to be executed for a crime he knows she did not commit?

In the plot of the novel, we are still on Walton’s boat. As the dying Victor continues to tell his story, he describes meeting the Creature on top of the Alps. He will quote to Walton, and to us, what the Creature says. We enter the inner component of the novel: The Creature’s story.

The Creature recounts his birth experience – finding his way from the unnatural lab to the wilderness, his awakening, stunningly described by Shelley, to the senses of light, dark, cold, hunger, thirst, warmth – and to elements of nature, birdsong, the moon, the sun. He discovers that fire can burn, as well as provide life-saving warmth. His utter humanity, his superior intellect, and powerful, graceful carriage are captured as Shelley changes to an elevated, powerfully poetic diction as the Creature speaks, in her tender descriptions of his observations of family love as he watches the De Lacey’s, and her portrayals of Victor’s glimpses of him, as he bounds up the rocks and ice of the glacier. Both he and Victor are at the summit of the earth, in a sublime and almost holy place that exhibits all the power of nature, suggesting that nature is a divinity beyond human comprehension.

Had Victor created a being whose appearance were deemed beautiful, the story surely would be different. But the Creature’s appearance in the eyes of the human race is hideous and frightful. After being drawn by loneliness to observe in secret the De Lacey family, the Creature is appalled when he sees his own reflection in water, and feels suffering and isolation. From observing the De Lacey’s, and with his superior intellect, the Creature learns language, another very important key to Shelley’s novel, and an important difference in the Creature’s depiction in later films.

The power of language should be a key discussion points for students. In Genesis, language gives humans power over the animals, and power so significant, God creates Babel to thwart our ability to conquer the heavens. As robots are learning to speak to us and to respond to our questions in more sophisticated, more human ways, what effect will that have on us, and our relationship with these beings, with other humans, and how we view ourselves?

The Creature also finds books: *Paradise Lost* and *The Sorrows of Young Werther*. He discovers Victor’s scientific notes. Students should consider why these texts are significant to thematic elements in the story. Why does the Creature relate both to Satan and to Adam in *Paradise Lost*? In what significant human ways does the creature suffer from Victor’s abandonment, as he reads his notes, in his own awareness of his difference in appearance, and in his origin?

The Creature tries to introduce himself to the De Lacey family by first speaking privately with the elder father, whose blindness shields him from the Creature’s fearsome looks. But the children arrive, and drive him violently away. As he flees, he comes across a young girl who has fallen into a lake and is drowning. When he saves her, he is shot by her father.

The Creature then begins his murderous spree targeted at Victor’s family. What he demands from Victor on the mountain is entirely human: He wants a mate, someone who will relieve his isolation and despair, someone with whom he can have love, community, and affirmation.

The story returns to the middle section, back to Victor. He initially agrees to create a female, as the Creature now threatens to isolate Victor, as he is isolated, by destroying his entire family. I would encourage students to wonder why Victor doesn’t tell anyone, or at least warn his family, about his creation. Why does he drag

poor Henry Clerval along with him to create the female, with no warning? Why does he presume that Creature's threat to see him on his wedding day after he has destroyed the female that he half-creates is directed at him, instead of at his fiancée Elizabeth? Why does he leave her alone?

We go back to Walton on the boat, the appearance of the Creature mourning Victor's death, promising to kill himself, and Walton's decision to turn around.

How do events in the Creature's short life shape his own, human psychology? What does any human child learn from abandonment by parents, and hatred from society? What themes from Shelley's own times might be incorporated into this story of social rejection, hatred, bias against others, and resulting violence? What can we learn in our own time of transition? Will our mistreatment of robots amplify, or normalize, mistreatment of others? Will our interactions with carefully-developed robots improve our relations with other humans, and increase understanding of the meaning of human life?

## **The Incomprehensible Machine - Gender and Race in *Frankenstein***

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In the center of *Frankenstein*, as the Creature is relating his life, we encounter another story within the De Lacey family. A young girl, Safie, whose father is Muslim and mother is Christian, has fled her native Turkey, where her father wants her to marry a Muslim, and have her live in a strictly religious way, severely limiting her freedom and options as a woman. She escapes to find refuge with Felix De Lacey. She doesn't know his language, and although they cannot speak to each other, Felix and Safie are in love. The Creature learns language as Felix teaches Safie how to speak and read. The power of love, language, and theme of freedom and acceptance are on display.

It is an odd story to have at the center of this book, but one that speaks to a feminist movement that was a part of Shelley's world. During the early 19<sup>th</sup> century, marriage was virtually the only option for women, and upon marriage, a woman and whatever children she bore, became the property of her husband. Females could not own property, nor manage their own assets. Safie's life with Felix would be freer than her life in Turkey, but she would still effectively be his property.

For the Creature, however, no level of eloquence or intellect would prevent his being hated – even in the progressive world of Switzerland in Shelley's time. During this time, moral objections to the enslavement of African people were rising. *Frankenstein* was first published in 1818 as the Abolition movement gained power. Slavery was abolished in England in 1833, shortly after the second publication of the novel.

In America, Thomas Jefferson, among others, argued that Africans could never be the intellectual or moral equals of Caucasians. But he called slavery “a moral and political depravity” and wrote in a letter to Jean Nicolas Demeunier, “What a stupendous, what an incomprehensible machine is man! who can endure toil, famine, stripes, imprisonment or death itself in vindication of his own liberty, and the next moment....inflict on his fellow men a bondage, one hour of which is fraught with more misery than ages of that which he rose in rebellion to oppose.”<sup>17</sup>

Perhaps the machines we *create* will be more humane.

## Hatred, Empathy, and What It Is to Be Human

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In the two hundred years since Mary Shelley first published *Frankenstein*, racism and bias against people of different religions and nationalities have radically evolved. However, with the recent rise of neo-Nazism, it seems that the fuse of tribalism and hatred is an easy one to reignite. Hatred isn't only racial, as often it divides members of the same community. What causes bias? Is tribalism so inborn, it cannot be erased?

We are not born to hate others who are different; we are taught hatred, much as the Creature in *Frankenstein* learns loathing for himself and violence towards others from the human community who abandon him and seek to harm him. And economic or national fears can trigger racism on larger scales. But it is not inborn.<sup>18</sup>

A simple rat experiment illustrates this point, since rats, like humans, tend to socialize in tribal groups. If a rat is raised only with white rats, it will not go the assistance of a black rat in trouble, although it will rather altruistically, attempt to help another white rat. However, if a rat is raised among a polychromatic assortment of rats, it will go to the aid of any rat in trouble. To that rat, its tribe is a rainbow.<sup>19</sup> As a human example, multicultural Hawaii exhibits less racism.<sup>20</sup>

Seeing each other as one, colorful human tribe is critical as we sprint forward in developing artificially intelligent technologies. For example, recently San Francisco banned new facial recognition technology because it has been shown not to distinguish female faces or brown-skinned faces with much accuracy.<sup>21</sup> The technology is not biased, but the people who programmed it did not prevent their own biases from flowing over the algorithms. Another example is the plethora of female voices for virtual assistants such as Siri, Cortana, and Alexa. They were created female because marketers discovered consumers prefer female voices.<sup>22</sup> Is this stereotype of compliant secretaries something we want to amplify in our society as virtual assistants become more prevalent? Do the female voices convey power?

In class, students will read articles on bias and racism, both in our computer programs, and in ourselves, and then will discuss the dangers of augmenting racial and gender biases, rather than working to erase them, as we create our robotic assistants.

Empathy and compassion, acceptance and patience, altruism and charity – these are all traits that humans can also learn, and the more prevalent they are in a society, the more they are reflected in the individuals in a society.<sup>23</sup> There is something to learn from rats – and perhaps from our humanoid computers, should we choose to program them in a way that might be beneficial to society. In a beautiful TED talk, Chris Milk suggests using virtual reality to help us see all humans as members of the same tribe. Alan Turing also believed that robots might “have initiative, have a sense of humour, tell right from wrong, make mistakes, fall in love, enjoy strawberries and cream...learn from experience...be the subject of its own thought...do something really new.”<sup>24</sup> Can robots save us from self-destruction? Might they be more humane, if not more human, than we are?

## The Uncanny Valley - Humanoid Entities in Film and Fiction

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In this part of the unit, students will independently explore fictional representations of a future world where humans and humanoids coexist. There are endless films and books on this topic, and students should be encouraged to choose a work themselves, including video games or virtual worlds, which are not suggested here, but will be incorporated into this unit from student recommendations. Class discussions will follow on topics below.

### Racism, Gender Bias, and Fear of the Self-Replicating Robot

The 1933 *Frankenstein* film is a classic misrepresentation of the novel, and a closer look at when it was made, and the brutal portrayal of the Creature as a cretin who is tortured and killed by a triumphant lynch mob is disturbing, especially in light of the Eugenics Movement and scapegoating and lynching of African Americans in the South during this time. Jill Lepore's article in *The New Yorker* offers key insights into this film.

Humanoids that can replicate, not unlike human females in a male-dominated society, are both desired and feared. Pandora, Pygmalion, and Eve stories recur in many modern creation stories. The stunning 1927 silent film *Metropolis* depicts a female robot that comes to symbolize the corruption and seductive power of the machine. The *Alien* films, which also feature a strong female lead, thematically depict the power of the womb. The original *Alien* film is based on *Beowulf*, a science-fiction archetype, also features a powerful maternal humanoid creature. Other examples include *Her* (2013), which depicts a female, bodiless virtual assistant, and *Ex Machina* (2014), which depicts a female humanoid desperate to free herself from bondage.

The next two recommendations are worthy for their source material. Philip K. Dick's story *Second Variety* adapted into the movie, *Screamers* (1995) depicts self-replicating war machines that gain sentience and revolt against both the Soviet Union and the United States to take over the world. The scientific basis for self-replicating computers is found in mathematician John Von Neumann's book, *Theory of Self-Reproducing Automata*, published in 1966.<sup>25</sup> Czech writer Karel Capek, credited with inventing the word "robot," was targeted by Hitler, but died before the Gestapo could catch up with him. His *Rossum's Universal Robots*, depicts humanoid slaves in a world where humans have even abandoned the desire to have children. After the humans are exterminated in a rebellion, the robots who had been genetically created without emotions, discover the ability to love.

### Who Is in Control?

The question of agency arises often in stories concerning our humanoid creations. Frequently, the message is similar to the one in *Frankenstein*: We are the ones responsible for the programming of the machines that we create, and all that is good or evil about them is a reflection of our own complex soul. The stories ask fundamental questions of what it means to be human, and what happens when we desire to clear our world of labor and death. The lack of understanding of this balance often creates chaos, for as in both the Prometheus story, the Mesopotamian Gilgamesh story, and in Genesis, immortality, instant fulfillment of every desire, and endless leisure are antithesis to experiencing a rich, full human life. In mythology, only mortal humans can be heroic, because despite knowing that we will die, we have the courage to love, and suffer, and strive, and hope. What happens when we yield the suffering that makes us fully human? Suggestions for reading include E.M. Forster's *The Machine Stops*, and two Ray Bradbury stories, *The Veldt* and *There Will Come Soft Rains*.

## Will Robots Kill Us? Or, Will They Be Kinder?

Stories abound that predict a kind of robot or mutant apocalypse. And why not? Human history is filled with oppression and revolution, not unlike in Mary Shelley's time. Pessimistically, it seems likely our own thirst to quench every desire will result in our self-annihilation. Optimistically, the trajectory of human civilization seems to point in fits and starts, to one less violent and more equitable.

Scientists and innovators including Vernor Vinge, Stephen Hawking,<sup>26</sup> Elon Musk,<sup>27</sup> and Yoshua Bengio<sup>28</sup> warn that governments need to step in to regulate dangerous technologies that are spiraling out of control. Computer scientist Jared Lanier argues in his book *You Are Not a Gadget*, that humans ultimately bear the responsibility to shape a humane technological world. One of my favorite films in the pessimistic mode with feminist overtones is the first of the *Terminator* (1984) films.

Some books and films pose the question of what it means to be human, and how our creations reflect our own flaws, such as Philip K. Dick's novel, *Do Androids Dream of Electric Sheep?* The novel is the source for the *Blade Runner* (1982, 2017) films, which are loose, but worthy adaptations of the book. The film *A.I.* (2001) features a humanoid with more humanity than people – a theme similar in the new novel by Ian McEwan, *Machines Like Me*.

Perhaps most important to this unit are Isaac Asimov's novels: *I, Robot*, *The Caves of Steel*, *The Naked Sun*, and *The Robots of Dawn*. The film version of *I, Robot* (2004) is a loose adaptation, but worth viewing on its own. One important difference is that in the film, humans regain control of the world. In the final story of the novel, called *The Evitable Conflict*, a machine in full compliance with Asimov's famous "Three Laws of Robotics" is in control, and has achieved what no human could: a peaceable kingdom.

## A Dream Vision of You in Your Future World

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The final project for this unit is what I call the "Dream Vision" project. The genre of dream vision poetry was popular in the Middle Ages. In these, a human traveler dreams, and sees mystical visions in unreal settings that are transformative. In waking, these oneiric experiences become instruments of transcendence and redemption.

For this project, students will use their research on robotic or biological technology to inspire their own vision of what the interaction between humans and transhumans could be like in the future, as they time-travel fifty years ahead. The form for this project will have an entirely open platform, provided a standard bibliography is attached: short story, poem, spoken work, storyboard, video, and perhaps soon, virtual reality. How will things turn out? Our creations, and our futures, depend on who we are as humans, and both need our careful consideration to build a better world.



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## Appendix: Implementing District and Common Core Standards

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This unit on the effects of genetic engineering and artificial intelligence complements a New Haven School District's curriculum unit for grades 9-10, which asks students to evaluate the way modern technology will affect their futures. This unit will also be used for my Advanced Placement Literature and Composition classes. The curriculum for this class draws on guidelines from the College Board, part of which requires that students learn about themes in literature in context with concurrent historical and social developments. This unit will be aligned with *Frankenstein*, the Industrial Revolution, and modern dystopian novels. Lessons include assignments that meet Common Core Standards for English Language Arts in gathering evidence and analyzing text, in integrating knowledge and ideas from articles, films, and videos addressing scientific advancements that will change our society, in assessing themes in literature and in crafting narratives based on personal or imagined experiences. Analysis will include interpretation of a variety of sources, including fiction and non-fiction, newspaper articles, poetry, and film.

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