Second Quarter, 2021-2022

S	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	11/1	11/2	11/3	11/4	11/5
	CLASS: 1.)	**CLASS:** 1.)	**Day 4**	**CLASS:** 1.)	**CLASS:** 1.)
	HMWK: 1.)	**HMWK:** 1.)		**HMWK:** 1.)	**HMWK:** 1.)
	11/8	11/9	11/10	11/11	11/12
	Day 1	**CLASS:** 1.)	**CLASS:** 1.)	**Day 4**	**CLASS:** 1.)
		HMWK: 1.)	**HMWK:** 1.)		**HMWK:**
	11/15	11/16	11/17	11/18	11/19
	CLASS: 1.)	**Day 1**	**CLASS:** 1.)	**CLASS:** 1.)	**Day 4**
	HMWK:		**HMWK:** 1.)	**HMWK:** 1.)	
	11/22	11/23	11/24	11/25	11/26
	CLASS: 1.)	**CLASS:** 1.)	**THANKSGIVING**	**THANKSGIVING**	**THANKSGIVING**
	HMWK: 1.)	**HMWK:** 1.)			
	11/29	11/30	12/1	12/2	12/3
	Day 1	**CLASS:** 1.)	**CLASS:** 1.)	**Day 4**	**CLASS:** 1.)
		HMWK: 1.)	**HMWK:** 1.)		**HMWK:**
	12/6	12/7	12/8	12/9	12/10
	CLASS: 1.)	**Day 1**	**CLASS:** 1.)	**CLASS:** 1.)	**Day 4**
	HMWK: 1.)		**HMWK:** 1.)	**HMWK:** 1.)	
	12/13	12/14	12/15	12/16	12/17
	CLASS: 1.)	**Block Day**	**Block Day**	**Block Day**	**Block Day**
	HMWK: 1.)				
	12/20	12/21	12/22	12/23	12/24
	Winter Break	**Winter Break**	**Winter Break**	**Winter Break**	**Winter Break**
	12/27	12/28	12/29	12/30	12/31
	Winter Break	**Winter Break**	**Winter Break**	**Winter Break**	**Winter Break**
	1/3	1/4	1/5	1/6	1/7
	CLASS: 1.)	**CLASS:** 1.)	**CLASS:** 1.)	**Day 1**	**CLASS:** 1.)
	HMWK: 1.)	**HMWK:** 1.)	**HMWK:** 1.)		**HMWK:** 1.)
	1/10	1/11	1/12	1/13	1/14
		Day 4		**PRE-CLASS NOTES:** 1.) On the first day of class you will be given a journal and a copy of 13 Things That Don't; (the journal is yours, the book you will return to me later) 2.) the class Website is found by going to **faculty.polytechnic.org/physics** and clicking on Cosmology, Astronomy and Relativity in the left-hand column; 3.) just so you know, if you find a URL on this pdf and it spans only one line, the link should be active and going to the page should only require a click; if the link spans more than one line, you will have to copy and paste the link into a browser to go to the site (this bit of weirdness seems to be the case in general with pdfs made from Excel files); 4.) also, be aware that our daily progress is not necessarily set in stone, so expect the calendar to change pretty continuously to reflect updates . . .	**(Sec. Sem. begins)** **Day 1**

Third Quarter, 2021-2022

SCI	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	1/17	1/18	1/19	**1/20**	1/21
	MLK Jr Holiday	**CLASS:** 1.) intro the course: (motiv. behind the course (old and new format emphasizing wonder); class Web site; journals; 2.) watch "relative size" "immensity of universe"; 3.) not only very large, but very small--talk about intricacies of atom (illusion, and you never really touch anything); 4.) this class will be devoted to introducing you to "stuff you didn't know existed;" to start out, a few words about mathematics (and the hole therein) at https://www.youtube.com/channel/UCHnyfMqiRRG1u-2MsSQLbXA 5.) start first part of "The Elegant Universe" at 3:30 min mark . . . found at https://www.pbs.org/wgbh/nova/series/the-elegant-universe/ just let it run . . .	**CLASS:** 1.) clarify what journal should be used for; 2.) talk about "2019 OK" and info about meteor craters (any wonder here?); 3.) at *unification* at 8:30 min mark: talk about trying to find equation that summarizes everything--how can that be (an equation summarizing stuff)--give theory behind springs as example . . . ; talk about Newton (Gmm/r^2 and inventing Calculus) and why he didn't like his theory; explain where Special Relativity came from (start with theory of e/m waves for light and Maxwell's equations, newton's theory of light)--note that the Elegant Universe's explanation of the problem comes from a different direction . . . 5.) note that when we get to Quantum Mechanics, we will segue and the weirdness will begin . . .	**Day 4**	**CLASS:** 1.) so where are we? Gravity doesn't exist, but gravitational effects do exist due to the interaction of mass and the fabric of space/time; 2.) continue with the Elegant Universe; 3.) back to unification--electricity and magetnism and Maxwell's equations (mentioned yesterday); 4.) note that the equations presented in the video are the differential forms of Maxwell's equations (you might name them--Gauss's Law, Gauss's Law for Magnetism, Ampere's Law and Faraday's Law); 5.) why couldn't Einstein create a Theory of Everything? (difference in strength outweighs similarities); 6.) when you get to how particles inside the atom interact with one another, stop the video and begin to look at Quantum Mechanics (stop at 30:20 min).
		HMWK: 1.) Google "2019 OK" and briefly write up what you find there; 2.) Google "meteor crater;" let your curiosity get the better of you . . . 3.) Go on-line to class Web page and read both "About the Books" and "Course Information." 4.) make your first entry into your journal	**HMWK:** 1.) make your second journal entry (you should have a ton of stuff to report by now . . .)		**HMWK:** 1.) journal
	1/24	1/25	1/26	1/27	1/28

Test Wk?	**CLASS:** 1.) begin discussion of QM with video of creepy guy and double slit experiment; 2.) introduce Mithuna Yoganathan and Looking Glass Universe (Google LGU to see all of her videos); 3.) first video: introduction to quantum mechanics (use my original version) --newer version is intro but also talks about what it means to be measured https://www.youtube.com/watch?v=8Dso6Fv1FUw 4.) take a quick look at the "newer version" 5.) look at "answers to questions" video (talks more about "what is a measurement?" at https://www.youtube.com/watch?v=YBcQ0PeFsx4;	**Day 1**	**CLASS:** 0.) direct students to homework 1.) remind students about superposition rule and measurement rule, then look at LGU wave function video (use my original version); 2.) a secondary video on wave function (not LGU) is at https://www.youtube.com/watch?v=EmNQuK-E0kI, don't use 3.) look at quantum randomness at https://www.youtube.com/watch?v=hGGb0nGTPLk&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=1 (this talks about the coefficients of the wave function--the probability functions), also, outcome random but probability not 4.) how likely are possible outcomes?--the Born Rule at https://www.youtube.com/watch?v=VHlqY44fOg0&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=2 (mention magn of complex numbers are called amplitudes n angles phases)	**CLASS:** 1.) reiterate what-all we've covered; 2.) noting that an eigenstate is just one of the possible states of a system and a wave function's "basis" is the parameter being measured, (don't) look at video on quantum interference at https://www.youtube.com/watch?v=tt8gVXDsh7Q&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=3--the follow-up to this video is at (don't use) https://www.youtube.com/watch?v=sTTgZQVtaPE&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=4 start at 2.45 (what is observable in double slit experiment); 3.)	**Day 4**
	HMWK: 1.) journal; 2.) google "wave function" in quantum mechanics and see if you can find a video that explains what it is (put URL in your journal)		**HMWK:** 1.) journal; 2.) pretend you are taking your first ORAL EXAM. Write out the talking points you would hit in that exam. In other words, what have we talked about in the last two weeks THAT YOU HAVE FOUND REALLY INTERESTING	**HMWK:** 1.) Google Amy Noether--read about her life 2.) look at the video about Noether's Theorem at https://www.youtube.com/watch?v=CxlHLqJ9I0A&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=7 (note that she misspoke about gravitational potential energy at the 3:10 mark--don't be put off by this--it's easy to do when riffing) 3.) concerning the video, read and think about the first three comments (from Eric Vilas and 12tone)	
	1/31	2/1	2/2	2/3	2/4

CLASS: 1.) talk about Heisenberg Uncertainty principle using LGU video at https://www.youtube.com/watch?v=rciVgQm-F_U&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=9 2.) show video of laser beam spreading out as slit cuts beam off . . . "visualization of Heisenberg's Unc Prin.flv" 2.) look at the Schrodinger Equation from two authors, the first from LGU: https://www.youtube.com/watch?v=ZfKq3g3MHqE&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=10 (talks about measurement problem), the other at https://www.youtube.com/watch?v=QeUMFo8sODk; 3.) how to use Schrodinger equation (LGU) at https://www.youtube.com/watch?v=DEgWbrMv6-k&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=11	**CLASS:** 1.) look at the deBroglie wavelength video at (this gets way too far into the weeds for most, but it has bits and pieces of stuff I want to talk about: https://www.youtube.com/watch?v=eqTY6Cyb0do&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=8 good review for wave function and eigenstates along with converting from position basis to momentum basis--talks about how the phase of an eigenstate might change even though the probability not due to the imaginary nature of the probability functions--(mention that Taylor expansion of "e^i(theta)" is the same as that of "cos(theta) + i sin(theta)";	**Day 1**	**CLASS:** 1.) take a few minutes to show formal derivation of Schrodinger's Equation; 2.) finish up Quantum Mechanics--do anything not done to date	**CLASS:** 1.) Oral Exams? (didn't do another until end of quarterr--need to do better next time)
HMWK: 1.) journal; 2.) if you find this interesting and want to look at quantum spin, look at the LGU video at https://www.youtube.com/watch?v=cd2Ua9dKEl8&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=5; and its extension covering angular momentum as spin at https://www.youtube.com/watch?v=z_6B2M12H9w&list=PLg-OiIIbfPj3JrdQgqkdlPe_jxRC0mw35&index=6	**HMWK:** 1.) journal; 2.) if you are still interested and want to learn more, look at the video on quantum entanglement at https://www.youtube.com/watch?v=Xzmp7byh77E 2.) you and also learn about "spin" at the quantum level at https://www.youtube.com/watch?v=gh7xITmvgyU		**HMWK:** 1.) journal; 2.) Google "Information Theory" to see what it is all about--see if you can find a connection between Information Theory and Quantum Mechanics; 3.) think about what you are going to say tomorrow during ORAL EXAM	**HMWK:** 1.) journal;
2/7	2/8	2/9	2/10	2/11
Day 4	**CLASS:** 1.) continue with The Elegant Universe--during video, talked about what strong force does (holds protons together in nucleus and weak force (creates new atoms after supernova via radioactive decay); talked about how forces in Standard Theory are assumed to be particle interactions, so String Theory is powerful as string vibrations can act like particle/forces;	**CLASS:** 1.) continue/finish The Elegant Universe; 2.) mention Mr. White's triple binary star system https://exoplanets.nasa.gov/news/1672/discovery-alert-first-six-star-system-where-all-six-stars-undergo-eclipses/; 3.) talk about the precision of the universe--show video The Fine Tuning of the Universe . .which has good info but is the religious one); 4.) run through discussion of alpha (use PowerPoint) 5.) show video Alpha Changing talk about the consequences of having fundamental constants changing in light of the previous video about the fine tuning of our universe; 6.) intro the Standard Model https://www.youtube.com/watch?v=Unl1jXFnzgo	**Day 1**	**CLASS:** 1.) we are trying to understand how the universe is built, so next up is a discussion of the Standard Model-- look over ppt on the Standard Model; 2.) look at video about "the beginning and progression onward" at https://www.youtube.com/watch?v=wNDGgL73ihY "CLASS: 3.) look at un-narrated ""Chronology of Universe"" https://www.youtube.com/watch?v=DB8651JE3xo kibitz: as you go (inflation, quark asymmetry, why 1 Tev is important, quark clumping; deuterium and He nuclei formation, 50-50 point for energy/radiation distribution, the first neutral atoms and light free streaming, first generation stars, second generation stars, etc.); 4.) look at preambles to Cosmological Timeline (temp/energy AND 2-sizes), then view timeline "

	HMWK: 1.) journal; 2.) from 13 Things That Don't Make Sense, read the Prologue, pages 1-7	**HMWK:** 1.) journal; 2.) from 13 Things That Don't Make Sense, read the Prologue, pages 7-13		**HMWK:** 1.) journal; 2.) from 13 Things That Don't Make Sense, read the Prologue, pages 13-19
2/14	2/15	2/16	2/17	2/18
CLASS: 1.) go through the Fundamental Particles and Forces ppt; 2.) talk about quarks, look at ppt on quark charge; 3.) find video on fundamental particles	**Day 4**	**CLASS:** 1.) read science fiction stories about antimatter 2.) show quarks changing colors video; 3.) in preamble to talking about the Higgs field, give explanation of what mass is, then talked about how Higgs field replaces those ideas in the Standard Model; 4.) to animate Higg's field, show video https://www.youtube.com/watch?v=joTKd5j3mzk (the quaint explanation); 2.) show the more sophisticated explanation of Higgs at https://www.youtube.com/watch?v=kixAljyfdqU 3.) talk about how Higgs field isn't only source of mass--look at video at https://www.youtube.com/watch?v=Ztc6QPNUqls&t=4s	**CLASS:** 1.) read science fiction stories; 2.) talk about 13 Things; (Slipher and red-shift; Hubble graphs speed vs distance--farther out faster--universe expanding--so farther away implies higher relative speed--the prop. const is the Hubble constant; talk WIMPS and cosmic radiation (have students fid video on Bubble Chmbr n Cosmic Radiation); 3.) talk about Zwicky's (spherical bastards) problem (stars at edge of galaxy moving too fast); 4.) talk about Vera Rubins fights for Zwicky's idea (answer: halo of dark matter explains high vel); 5.) look at atomic interactions video (first 30 seconds of alpha decay at https://www.youtube.com/watch?v=gwl2lnl9ujc n all beta decay https://www.youtube.com/watch?v=2gK-bANOMaU); 6.) how larger elements made using beta decay	**FACULTY PROFESSIONAL GROWTH DAY** (no school)
HMWK: 1.) journal; 2.) from 13 Things That Don't Make Sense, read pgs 19-25;		**HMWK:** 1.) journal; 2.) write three-sentence science fiction story that utilizes the idea of anti-particles	**HMWK:** 1.) journal; 2.) go to the "Secret Stuff" folder on the class Website and read "Drinking Heavy Water'	
2/21	2/22	2/23	2/24	2/25
PRESIDENT'S DAY (no school--again, you lucky ducks)	**Day 1**	**CLASS:** 0.) compressed last few days--will do today tomorrow) 1.) begin to look at light as a particle: start with Photoelectric Effect; 2.) look at video on photoelectric effect at https://www.youtube.com/watch?v=MFPKwu5vugg 3.) show photoelectric demo at https://www.youtube.com/watch?v=v-1zjdUTu0o 4.) talk about how light is produced by atoms; 5.) video summary how light is produced in an atom is at https://www.youtube.com/watch?v=N9nWdNadklE	**CLASS:** 1.) talk about emission spectra; 2.) look at silent video about emission and absorption spectra at https://www.youtube.com/watch?v=m69GjvN3n0M ; 3.) talk about absorption spectra--look at flawed video at https://www.youtube.com/watch?v=XHpiJj3osTU 4.) show Spectroscope	**Day 4**
		HMWK: 1.) journal	**HMWK:** 1.) journal;	
2/28	3/1	3/2	3/3	3/4

CLASS: 1.) do Spectroscopy lab; 2.) Senior Ditch Day	**CLASS:** 10.) for those out on Ditch Day, quickly look at Spectroscope 1.) introduce light as a wave with video at https://www.youtube.com/watch?v=Iuv6hY6zsd0; 2.) talk about electromagnetic radiation--start with how radio waves are produced and what you end up with; 3.) look at video (only partially good--at https://www.youtube.com/watch?v=hk63uUhkZH4	**Day 1**	**CLASS:** 1.) look at the nice summary of light: https://www.youtube.com/watch?v=IXxZRZxafEQ 3.) possibly do Optical Potpourri lab? 4.) talk about reflection; 5.) show spherical mirror 6.) do ray tracing exercise;	**CLASS:** 1.) diffraction (we've talk about this before with the double slit--give its definition and show demos); 2.) talk about refraction using https://www.youtube.com/watch?v=Bf1k9-4bb4w ; 3.) give exotic examples of refraction--talk about thin films, oil slicks and beetles (find videos), 4.) look at mirages with video from India https://www.youtube.com/watch?v=pMMJo2q5ADM ,
HMWK: 1.) journal;	**HMWK:** 1.) journal		**HMWK:** 1.) journal	**HMWK:** 1.) journal
3/7	3/8	3/9	3/10	3/11
Day 4	**CLASS:** 1.) ask the question "why is the sky blue?" then talk about looming and the green flash--use video at https://www.youtube.com/watch?v=Iwus2nqU0SY; 2.) show Snell's Law derivation (quickly); 5.) talk about critical angle and its consequences (wave guides, pools); 6.) talk about lenses	**CLASS:** 1.) talk about Doppler Shift--look at video at https://www.youtube.com/watch?v=h4OnBYrbCjY 2.) relevance to astronomy (start at about 1 minute)? https://www.youtube.com/watch?v=3mJTRXCMU6o 3.) talk about how the sun produces spectral lines (need to talk about black body radiation first, then talk about how light progresses from core outward) 4.) spend a little time talking about telescopes (use video at https://www.youtube.com/watch?v=LzII1f3pp-8);	**Day 1**	**last day of third quarter** **CLASS:** 1.) do Optical Potpourri lab
	HMWK: 1.) journal;	**HMWK:** 1.) relax		**HMWK:** 1.) journal

Fourth Quarter, 2021-2022

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
3/14	3/15	3/16	3/17	3/18
CLASS: 1.) ORAL EXAM	**Day 4**	**CLASS:** 1.) look at AP schedule and see who will be around when; 2.) talk about distance to celestial objects-- 3.) astronomic unit; 4.) parsec; 5.) luminosity, energy density, and apparent brightness; 6.) standard candles; 7.) apparent magnitudes and absolute magnitudes; 8.) spectral classes https://www.youtube.com/watch?v=Y5VU3Mp6abI&t=1s	**CLASS:** 1.) preamble to section (celestial sphere; plane, constellations; the Zodiac; celestial plane; seasons, years, etc.)--find good video for this . . . 2.) for fun, show "night sky with various degrees of city light," then "celestial sphere," 3.) talk about types of year--nice summary of earth information (sidereal day, size comparison to sun, etc.) https://ciechanow.ski/earth-and-sun/ 4.) talk about "leap year" (find good video for this);	**Day 1**

HMWK: 1.) journal;		**HMWK:** 1.) journal; 2.) determine how far you are, in miles, from where you were in the galaxy when you were born	**HMWK:** 1.) journal; 2.) for fun, read the article at http://www.jpl.nasa.gov/news/news.php?feature=6223&utm_source=iContact&utm_medium=email&utm_campaign=NASAJPL&utm_content=daily20160330-2	
3/21	3/22	3/23	3/24	3/25
Spring Break	**Spring Break**	**Spring Break**	**Spring Break**	**Spring Break**
3/28	3/29	3/30	3/31	4/1
Spring Break	**Spring Break**	**Spring Break**	**Spring Break**	**Spring Break**
4/4	4/5	4/6	4/7	4/8
CLASS: 1.) spent day looking at "How the Universe Works" episode talking about the age of the universe; 2.) should have talked about Hertzsprung-Russell diagrams https://www.youtube.com/watch?v=_EtlJCfaxdc; 3.) how the H-R diagram can be used to determine the distance to a star https://www.youtube.com/watch?v=rBFWikTXFXI 4.) talk about molecular clouds https://www.youtube.com/watch?v=d9sZn3KbR9k, protostars https://www.youtube.com/watch?v=a-rUtp7Alh8 and stellar nurseries https://www.youtube.com/watch?v=EhTbAP1Iyhk; 5.) start stellar evolution of stars of size less than 8 solar masses	**CLASS:** 1.) started doing stuff from yesterday . . . 2.) talk about stellar evolution of stars whose mass is less than 8 solar masses; 3.) look at stellar evolution ppt at http://faculty.polytechnic.org/physics/1%20Astronomy,%20Cosmology,%20Relativity%202007to2008/7._Section_7_(stellar%20evolution%20and%20planets)/1._Summary_Sect_7--stellar_evolution_and_planets/d.%20small_mass_star_evolution.pdf 4.) look at HISTORY CHANNEL video on stellar evolution (about a half hour);	**Day 4**	**CLASS:** 1.) talk about stellar evolution of stars whose mass is greater than 8 solar masses; 2.) talk about supernovas; https://www.facebook.com/watch/?v=198111215316701 3.) look at supernova video at 4.) look again at nuclide chart and reiterate where elements larger than Fe come from;	**CLASS:** 1.) talk about angular momentum, 2.) talk about pulsars; 3.) listen to pulsars at https://www.youtube.com/results?search_query=sound+from+pulsars or https://www.youtube.com/watch?v=j_3sHeUNn1k and black holes at https://www.google.com/search?q=How+the+Universe+works+episode+black+holes&client=safari&biw=1265&bih=969&ei=C4dZYoCjOYHQkPIPxcmHkA8&ved=0ahUKEwjA1JenqZb3AhUBKEQIHcXkAfIQ4dUDCA0&uact=5&oq=How+the+Universe+works+episode+black+holes&gs_lcp=Cgdnd3Mtd2l6EAMyBggAEBYQHjIGCAAQFhAeMgUIABCGAzIFCAAQhgM6BwgAEEcQsANKBAhBGABKBAhGGABQmR1YlDJgyjRoAnABeACAAWqIAaUIkgEDOC4zmAEAoAEByAEIwAEB&sclient=gws-wiz#kpvalbx=_GYdZYsjaJ7XNkPIP2sqn8AU12 2.) talk about quasars at https://www.youtube.com/watch?v=3TZEp_n3eIc	
HMWK: 1.) journal;	**HMWK:** 1.) journal;		**HMWK:** 1.) journal	**HMWK:** 1.) journal
4/11	4/12	4/13	4/14	4/15
Day 1	**CLASS:** 1.) talk about Kepler's Laws 2.) basic video on laws: https://www.youtube.com/watch?v=AKbfR5KHUm4 3.) talks about Brahe https://www.youtube.com/watch?time_continue=83&v=wjOOrr2uPuU&feature=emb_logo	**CLASS:** 1.) do ORAL EXAM	**Day 4**	**CLASS:** 1.) begin to talk about Einstein; 2.) whimsical video on Einstein at https://www.youtube.com/watch?v=N51uYJy2nZM 3.) present what motivated Einstein to create the Special Theory of Relativity; 4.) point out the difference between the Special and General Theory of Relativity;
	HMWK: 1.) journal; 2.) think about what you are going to say during the Oral Exam on Friday	**HMWK:** 1.) jrelax		**HMWK:** 1.) journal
4/18	4/19	4/20	4/21	4/22

CLASS: 1.) talk about consequences of Einstein's assumptions; 2.) talk about the Michelson/Morley experiment; 2.) do baseball analogy--talk about how "c" can always be the same; 4.) begin to talk about consequences of "c" always being the same using space ship comparison (intro to time dilation and length contraction)--good "time dilation" video/lab at https://galileoandeinstein.phys.virginia.edu/more_stuff/Applets/Lightclock/home.html ; 5.) good discussion of causality and the hyperbola patterns mirror proper time count (very essoteric)	**Day 1**	**CLASS:** 1.) talk more about time dilation (powerpoints); 2.) show derivation of time dilation and length contraction; 3.) talk about space-time diagrams and world lines; 4.) talk about problem of units on axes of space/time diagrams (that time is like a distance, like an x/y graph);	**CLASS:** 1.) talk about relativistic factor and relativistic velocity--look again at derivation of length contraction (ppt messed up last time); 2.) give banana-eating chimp problem; 3.) look at a space/time diagram--talk more about units for its axes and notice its vagaries 4.) explain why the primed axes looks the way they do on a space-time diagram; 5.) talk about how you take data off a space-time diagram; 6.) do space-time diagram/world line exercise;	**Day 4**
HMWK: 1.) journal;		**HMWK:** 1.) journal	**HMWK:** 1.) journal	
4/25	4/26	4/27	4/28	4/29
CLASS: 1.) talk about magnetism; 2.) talk about paradoxes	**CLASS:** 1.) talk about paradoxes; 2.) talk about Twins Paradox conceptually; 3.) show space/time diagram of Twins Paradox; 4.) great cartoon/video about Twins Paradox at https://www.youtube.com/watch?v=h8GqaAp3cGs	**Day 1**	**CLASS:** 1.) talk about general relativity 2.) good video on General Relativity: https://www.youtube.com/watch?v=tzQC3uYL67U 3.) another way to look at General Relativity at https://www.youtube.com/watch?v=wrwgIjBUYVc 4.) time and space around a black hole (more General Relativity) at https://www.youtube.com/watch?v=wrwgIjBUYVc 5.) sometime during the AP week, have students do their last Oral Exam	**CLASS:** 1.) do Oral Exam; 2.) watch Mechanical Universe on Lorentz Contraction (listing at https://www.youtube.com/playlist?list=PL8_xPU5epJddRABXqJ5h5G0dk-XGtA5cZ)
HMWK: 1.) journal;	**HMWK:** 1.) journal		**HMWK:** 1.) journal	**HMWK:** 1.) journal
5/2	5/3	5/4	5/5	5/6
Day 4 **Spanish Lit AP**	**CLASS:** 1.) look at video on light cones and time and space swapping places at the event horizon of a black hole (really interesting): https://www.youtube.com/watch?v=GQZ3R81iyE0&t=100s	**English Lit** **Comp Sci (4)** **CLASS:** 1.) we will have only half the class this day	**Day 1**	**U.S. History** **CLASS:** 1.)
	HMWK: 1.)	**HMWK:** 1.)		**HMWK:** 1.)
5/9	5/10	5/11	5/12	5/13
Calc **Comp Sci Principles (4)** **CLASS:** 1.) we will have half the class--do oral exam for those who are here (Caroline, Parm, Alicia, Kekoa, Liem)	**Day 4** **English Lang AP** **Physics AP**	**Chinese Lang** **Spanish Lang (2)** **CLASS:** 1.) we will have half the class--do oral exam for those left (Catie, Opal, Griff,	**French Lang (1)** **CLASS:** 1.) do oral exams for those left (Sophie, Kai)	**Day 1** **Music Theory AP** **Latin AP**
HMWK: 1.)		**HMWK:** 1.)	**HMWK:** 1.)	
5/16	5/17	5/18	5/19	5/20

	CLASS: 1.) start with video https://www.youtube.com/watch?v=yWO-cvGETRQ at the 2:35 minute point to get definition of "informaion," then go to https://www.youtube.com/watch?v=9XkHBmE-N34 to hear about the information paradox and black holes.	**CLASS:** 1.) talked about solar system; 2.) have students look up and present information about Mercury, Venus and Earth	**Day 4**	**CLASS:** 1.) had students look up and present information on Mars, Jupiter and Saturn; 2.) use video on retrograde motion to animate that idea (important in understanding Mars's motion relative to the earth); 3.) had students finis planets off with Uranus and Neptune	**CLASS:** 1.) look at video on extreme planets at https://www.youtube.com/watch?v=0XUWFtyRzqs 2.) look at 10 strangest planets at https://www.youtube.com/watch?v=H8XWy2AvqlU 3.) if time, look at renegade planets at https://www.youtube.com/watch?v=nu9l9uKRfLk ; 2.) finishing touches on semester--block day even will happen next Thursday at 1 pm in rm 110 (we'll hear from Dr Lawler, an astronomer based in Canada . . . and a friend of R Dunham)
	HMWK: 1.)	**HMWK:** 1.)		**HMWK:** 1.)	**HMWK:** 1.)
	5/23	5/24	5/25	5/26	5/27
	Day 1	**BLOCK DAY**	**BLOCK DAY**	**BLOCK DAY** we meet at 1 pm in Rm 110	**BLOCK DAY**
	5/30	5/31	6/1	6/2	6/3
	Memorial Day Holiday SENIOR TRIP	**BLOCK DAY**	**last day of classes**		**US Honors Day, Commencement**