IB Physics

Relativity and Astrophysics

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| Block | Class  | Due on this class |
| 1Mar 20 | -The Michelson-Morley experiment-Einstein's Gedanken-The two postulates of Special Relativity-Time Dilation-The Twin Paradox and relative time-Length Contraction and 4-D space-time -Mass Dilation and the ultimate speed limit of the Universe | **Read:** 26.1-6 |
| **Mar 21-29** | **|: break yay Spring break yay Spring break yay Spring :|** | (IB Folks finish as much of the exam and the climate change as possible) |
| 2Mar 31 | -Simultaneity-Mass and energy: Relativistic kinetic energy-Relativistic addition of velocities-Energy-momentum relationship**-PreQuiz 26.1** | **Video Flip:** Relativistic KE, Velocity addition, Momentum **Read:** 26.7-11 |
| 3 **Apr 2** | Work on problems: (See Check #1 and #2)-Time, length, mass-Relativistic addition of velocities-Energy and energy momentum**-Skill Set 26.1** | **Turn in:** PQ 26.1 |
| 4Apr 6 | **-Intro to Astrophysics****-The Structure of the Universe:**-Our solar system/Galaxy - /Nebulae/Clusters/Groups/Superclusters**-Scale Model of the Solar System** | **Read:** 33.1 **Check #1:** Worksheet 26: 7-13, 20, 22-25, 28-31 |
| 5Apr 8 | **-Units of distance:**-Astronomical Units (au) /Parsecs (pc) /Light Years**Stars: Part One – Distance and Brightness**-Wien’s Law -Absolute Luminosity-Apparent Brightness | **Read:** 33.3**Check #2:** 26: 1, 4(69.1 Ly), 7, 8(0.436c), 13, 14(0.887 c), 26(0.866c), 28(2.23×10-9 J, 6.46 × 10-18 kg m/s), 29, 31, 43, 46(0.65c), 48(0.70c) |
| 6**Apr 13** | -Apparent and absolute magnitude-H-R diagrams**-Stars: Part Two - Stellar Evolution**-Birth/Main sequence | **Read:** 33.2 **Check #3:** Astro: 1-5, 33: 1, 3, 5, 7 |
| 7Apr 15 | -Red giants? Supernova? Pulsar? Neutron Star? -Black Holes? White Dwarves-Stellar Evolution Flowchart | **Read:** 33.2**Check #4:** Astro: 6-10, 33: 34(A: T+, L=, S-, B: T=, L-, S-, C: T-, L+, S+), 35 |
| Thurs, 4/16 | **IB Review of last year stuff** |  |
| 8Apr 17 | **-The distance ladder**-Measuring the AU/Measuring Parsecs-Using H-R diagrams-Variable stars: RR Lyrae, Cepheids-Type I Supernovae/Galaxy brightness | **Read:** Your notes?**Check #5:** Astro: 11-14, 33: 8(1.3E3 W/m2, 3.7E26 W), 9, 11 |
| 9**Apr 21** | **-General relativity**-Principle of equivalence-Curved space-Black holes and the Schwarzschild radius | **Read:** 33.4**Check #6:** 33: 12(2.33E-5 rad), 13, 14(5.4E17 kg/m3, 2.9E8x, 1.3x)**Turn In:** Stell Evolution Flowchart |
| 10**Apr 23** | **-Expanding Space**-Olber’s Paradox/steady state-Redshift-Hubble’s law-**Prequiz**  **33** **– Take Home** | **Read:** 33.5**Check #7:** Astro: 15-17, 33: 18(2.95 km, 8.9 mm), 19  |
| 11**Apr 27** |  **-The standard model (The Big Bang)**-The precepts-The cosmological principle-The cosmic microwave background | **Read:** 33.6**Check #8:** Astro: 18-19, 33: 22(140 MLy), 23, 24(0.88c)(Use the book’s version of the Hubble constant) |
| **Apr 28** | IB Review!!! | **Have completed the IB tests from 2014, and turn in your solutions to the Energy and Climate change chapter** |
| 12**Apr 30** | **-The standard model (The Big Bang)- Part II**-Inflation and the future of the universe-The shape of the Universe-Where's the missing matter?-Hubble Lab – Expanding Universe | **Read:** 33.7-10**Check #9:** Astro: 20, 33: 30(1.1E-3m), 44(1.4E16 K, hadron era), 25 |
| 13**May 4** | **Test on Astro and Relativity**(IB folks must take this test before the IB test on May 8th) (Maybe come in 3B on Wednesday May 6th) | **Turn in: Homework – 9 stamps worth****Turn in: Hubble Lab****Turn in: PQ 33** |
| Two Prequizzes* 26.1 – Special Relativity – length contraction, etc
* 33 – Astrophysics – Hubble’s Law and stuff

One SkillSet* 26.1 – Special Relativity

Two Labs (possibly):* Stellar Flowchart - interactive online flowchart
* Hubble Constant Lab – Expansion of a mini linear universe

Homework:* 6 day’s worth!

One Test* A normal Murray test – look at the review materials.
 | Handouts:* This Syllabus
* PreQuiz 26.1 – Special Relativity
* PreQuiz 33 – Hubble’s law and stuff
* Chapter26Problems
* Lab-HubbleConstant
* Worksheet-Astrophysics
* Many NoteGuides
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