IB Physics

Atomic and Nuclear

Chapter 27, 28, 30, 31 Syllabus

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| Block | Class | Due on this class[[1]](#footnote-1) | | |
| 1  **Feb 9** | -Hubris at the end of the century  -Einstein's particle theory of light  -Photo-electric effect | **Read:** 27-1, 2, 3  Bring your data booklet. | | |
| 2  **Feb 11** | -Momentum of Photons  -de Broglie wavelengths and electron microscopes  -Electron Diffraction | **Read:** 27-4, 7,8,9  **Check #1:** 27:10(5.87E-26 J, 3.67E-7 eV), 11, 18(401 nm), 20(2.18 eV, 0.93 V), 21 | | |
| 3  **Feb 13** | -Rutherford's atom and Closest approach  -Bohr’s atom and atomic spectra | **Read:** 27-10,11,12,13  **Check #2:** 27: 14(1.1E-27 kg m/s), 15, 22(0.93 eV, 5.7E5 m/s), 23, 24(Wo = 3.55 eV, a. 0.90 eV, b. no electrons) | | |
| 4  **Feb 18** | **-PreQuiz 27.1 -** Photons  -The Heisenberg uncertainty principle  -The Schrodinger wave equation | **Read:** 28-1,2,3,4,5  **Check #3:** 27: 37, 41, 50(6 to 3), 52(488 nm, 103 nm, 435 nm), 63, 77 | | |
| 5  **Feb 20** | -Atomic Notation and Binding Energy  **-Skill Set 27.1** | **Read:** 30-1,2  **Check #4:** 28: 3(1.3E-11m), 4(2.9E3m/s), 5(3.3E-8 ev), 6(1.3E-25 s) | | |
| 6  **Feb 24** | -Radioactivity/Types of radiation  -Alpha decay energy/Tunneling (Heisenberg Energy) | **Read:** 30-3,4,5,6,10,12  **Check #5:** 30: 11, 12(7.48 MeV/nucleon), 13, 14(32.0MeV, 5.33MeV/Nucleon, 1.64 Gev, 7.87 MeV/nucleon) | | |
| 7  **Feb 26** | -Half life  -Decay rates | **Read:** 30-8,9,11  **Check #6:** 30: 28a(6.11 MeV), Nuclear: C: P1-3, Q1, E: P1-2, Q1[[2]](#footnote-2) | | |
| 8  **Mar 2** | -Nuclear Reactions  -Nuclear Fission and Fusion  -Nuclear stability – The strong nuclear force | **Read:** 31-1,2,3  **Check #7:** 30: 36(2.3 hr), 37, 38(1.2E9 decays/s), 39, 43, 44(4.3E16 nuclei, 2.9E15 nuclei, 6.5E13 decays/s, 26 min) | | |
| 9  **Mar 4** | **-PreQuiz 30.1 –** Nuclear  -Digital information storage/ Binary | **Read:** 14.1, 2, 6 (SL-HL Text)[[3]](#footnote-3)  **Check #8:** 31: 5, 3, 11, 12(5.025 MeV, exo), Nuclear: M: 12 | | |
| 10  **Mar 6** | -Image resolution and CCD devices  -Graph of Photo assignment – make the graph  **-Skill Set 30.1** | **Read:** 14.1.3, 4, 5 (SL-HL Text)  **Check #9:** Digital: A: 1-3, B1-3[[4]](#footnote-4), 30: 49 | | |
| 11  **Mar 10** | -Image resolution and CCD devices  -Decay Lab  -Lines and slopes on the Photo Electric Graph | **Video Flip: Photo Electric Graph (points and error bars)**  **Read:** 14.2.\* (All of 14.2 from the SL-HL Text)  **Check #10:** Digital: E: P1-3,30:56(1.8E4 yr), 31: 18(6E18 reactions/s) | | |
| 12  **Mar 16** | -Finish Photo Electric Graph  -Work on Decay lab | **Check #11:** Digital: G: P1-2, 31: 17, 22(3.7E-4 kg)  **Turn In: Graph of Photo-Electric** | | |
| 13  **Mar 18** | **IB Mock Test on Atomic and Nuclear** | **Turn In: HW27- 31:** 11 stamps!  **Turn In: Decay Lab** | | |
| **Mar 20** | **Relativity!!!!!!!!!!!!!!** |  | | |
| Assignments   * 2 Labs:   + Photo-Electric Effect Graph – Graph data with uncertainty and best fit lines to determine the work function and Planck’s constant   + Decay Lab – Determine the half-life of a computer simulated nuclear decay * 2 PreQuizzes/Skillsets   + 27.1 – Photons   + 30.1 – Nuclear * Homework from 11 days   A crazy actual IB test. (It will be as hard as H%$&.) I will tell you what is on it, and pls study!!! | | | | Handouts   * PreQuiz27.1 * PreQuiz30.1 * This Syllabus * Lab-NuclearDecay * Lab-PhotoElectric * Objectives A-F, G-O * Nuclear Objectives A-S * Digital Information A-L * Many note guides * Climate Change EC Unit |

1. Be careful – we skip around a lot from chapter to chapter in this unit. Some things are even from a different text. 27: means problems from Chapter 27. Your homework will be super important in this unit, you will need to work hard on it. [↑](#footnote-ref-1)
2. These problems are on the Nuclear Objectives A-S sheet. P means problems, Q means questions. [↑](#footnote-ref-2)
3. This text is at tuhsphysics.ttsd.k12.or.us just put “/IBDocs/IB-SL-HL-Textbook/” at the end. [↑](#footnote-ref-3)
4. These problems are on the Digital Information Storage Objectives A-L Sheet. Do the problems. [↑](#footnote-ref-4)