

Subject: Physics C – AP – Mechanics

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- We follow the district grading policy for AP classes.
- There will be a minimum of 4 major grades in a quarter, and usually over 15 daily grades, including homework assignments.
- Formal labs are major grades. The labs are open ended and like the AP free-response problems.
- There are no projects.

Sources used throughout:

- a. Textbook – *Fundamentals of Physics 6E*– Halliday, Resnick, and Walker – ISBN 0-471-33235-6
- b. Throughout the year there are teacher notes incorporating teaching experience
- c. AP Classroom <https://myap.collegeboard.org/login>
- d. Online resources: <https://hs.saplinglearning.com/ibiscms/login/>
- e. Online homework platform: <https://www.webassign.net>
- f. schoolology: <https://calallen.schoolology.com/>

The class meets every day, there are no extended class periods available for labs. We cover only the Mechanics portions of the test and we finish about three weeks ahead of the test in order to review. During the year we work on free response problems and beginning in February the students will start taking the multiple choice released tests.

The class is open to anyone who wants to take the course. We allow our students to choose to take whatever they choose. We encourage them to challenge themselves. The class is usually very small. We encourage everyone to take the test.

The Unit Tests are primarily multiple choice questions drawn from the Halliday, Resnick and Walker Fundamentals of Physics 5E and 6E test banks and released AP-C tests, with some problems added at the end of some of the tests that are more free response style. Beginning in the spring, the tests will begin to include fewer multiple choice and have free response problems from a previous AP test added on at the end of some exams. Those are graded using the AP rubric.

Semester Exams: First Semester there will be a comprehensive exam that will be short, due to time constraints. Right before the AP Exam, there will be an AP style exam given and graded using AP rubrics that will serve as the final exam. If testing for AP the score will be exempted.

LABS – Physics C AP is a second year course preceded by Physics I Pre-AP which is a survey course that introduces the students to the concepts of physics and includes many of the Level I labs with detailed guidelines from the teacher. In the first year course they are also required to do six more complex projects, some of which require internet research and all of which require

time outside of class. In the second year class the labs are much more open ended and the guidelines range from little to none. These labs are Level II, III and IV as described in the Physics Teacher's Guide. At least four formal reports are required throughout the year, using guidelines modeled after those acquired at the summer AP conferences in Dallas. The students will be given those guidelines with the first lab and they will be adhered to throughout the year.

The following is a list of each topic required by the College Board and assignments for that topic. **DISCLAIMER:** the problems assigned might be changed from time to time. The days spent on each unit will vary depending on our need to remain flexible.

Date	Time	Units and Topics	Acorn Book	Assignments
8/12-13	1-2	Chapter 1 – Measurements		Pg 8 #1, 5, 6, 7, 10, 16, 19
	(12 days)	Chapter 2 – Motion Along a Straight Line	IA	
8/16	3	a. Terms	IA1	Pg 28 #3, 5, 7, 8
8/17-18	4	b. Special Case Formulas – derivations	IA1	Pg 28 #22, 25, 29, 30, 35-38
8/19	5	c. Graphing motion		Graphing Activity Worksheet Pg 28 #10, 13, 14, 16, 18
8/20	6	d. Derivatives		Derivative Worksheets 1, 2 Pg 28 #19, 20, 21
8/23-25	7-8	e. Integration	IA1	Integral Worksheets 1, 2
8/26	9	f. Free fall		Pg 28 #41, 43, 44, 46, 59, 62
8/27-31	10-13	g. Lab, Review and Test		
	9 days	Chapter 3 – Vectors	IA	
9/1	14	a. Definitions and terms 3.1-3.2		Pg 45 #1-6 Pg45 #7-9
9/2	15	b. Components 3.3		Pg 45 #10-15, 19, 20, 22, 24
9/3	16	c. Unit Vectors and adding vectors by components 3.4-3.6		Pg 45 #29-31 Pg 45 #32-38
9/7	17	d. Dot products 3.7		
9/8	18	e. Cross products 3.7		
9/9	19-22	f. Review and Test		
9/10-14				
	9 days	Chapter 4 – Motion in Two and Three Dimensions	IA1,2	

9/15	23	a. Linear motion unit vectors 4.1-4.4	IA1,2	Pg 67 #2-5, 7, 8
9/16-17	24-25	b. Projectile Motion 4.5	IA2	Pg 67 #10, 11, 13, 14 Pg 67 #19, 20, 22, 23, 25 Pg 67 #26, 27, 29, 31, 35
9/20	26	c. Uniform Motion 4.6	IA2	Pg 67 #43, 45-47, 49, 51
9/21	27	d. Relative Motion 4.7	ID3	Pg 67 #53-55, 57, 58, 61
9/22-24	28-31	e. Review and Test		
	7 days	Chapter 5 – Force and Motion I	IB	
9/28	32	a. Newton's 1 <sup>st</sup> and 2 <sup>nd</sup> Laws of Motion, Force diagrams 5.1-5.5	IB1	Pg 93 #3, 5-7, 9, 12
9/29	33	b. Newton's 3 <sup>rd</sup> Law 5.6,5.7	IB2,3 IB2	Pg 93 #14-16, 19, 20, 23 Pg 93 #25, 27, 29, 31, 37, 38
9/30-1	34-35	c. Applying Newton's Laws - Atwood's 5.8	IB2	Pg 93 #40, 43, 45, 47, 50 Pg 93 #32, 33, 35, 36, 52, 55, 56
10/4	36	d. Applying Newton's Laws Elevators and others 5.8		
10/5-7	37-39	e. Lab, Review and Test		
	10 days	Chapter 6 – Force and Motion II	IB	
10/8	40-41	a. Friction 6.1-6.2	IB1-3	Pg 112 #2, 5, 7, 9, 10, 13 Pg 112 #15-19 Pg 112 #22, 24, 25, 27, 28 Pg 112 #32, 33, 35
10/12	42	b. Drag Force and Terminal Speed 6.3	IB1-3	
10/13	43	c. Uniform Motion – Circular Motion, Centripetal Force, Vertical Circles 6.4	IB2	Pg 112 #37, 38, 41, 43-45, 47
10/14	44		IB2	Worksheet Banked Curves
10/15	45	d. Banked Curves 6.4	IB2	Worksheet Conical Pendulums
10/18	46	e. Conical Pendulums 6.4		
10/19-22	47-50	f. Lab, Review, Test		
	8 days	Chapter 7 – Kinetic Energy and Work	IC1,4	
10/25	51	a. Energy, Work and Kinetic Energy 7.1-7.3	IC1	Pg 136 #2, 4, 5-7, 10, 11
10/26	52	b. Work done by Gravitational Force 7.4	IC1	Pg 136 #13, 15-18

10/27	53	c. Work done by a Spring Force 7.6	IC1	Pg 136 #24-26
10/28	54	d. Work done by a Variable Force 7.5	IC4	Pg 136 #21-23
10/29 11/1-3	55 56-58	e. Power 7.7 f. Review and Test		Pg 136 #30, 31, 33, 35, 39, 40
	8 days	Chapter 8 – Potential Energy and Conservation of Energy	IC2,3	
11/4	59	a. Potential Energy 8.1-8.3	IC2	Pg 160 #2, 4, 5, 8, 10, 13
11/5	60	b. Conservation of Mechanical Energy 8.4	IC3	Pg 160 #16, 18, 22, 25, 26, 28, 30a,b
11/8	61	c. Reading PE Curve 8.5	IC3	Pg 160 #36,38
11/9	62	d. Conservation of Energy 8.6,8.7	IC3	Pg 160 #39-41, 43-45, 48-50
11/10	63			Pg 160 #51, 52, 54-56, 58-60
11/11-15	64-66	e. Review and Test		
	16 days	Chapter 9 and 10 – Systems of Particles and Collisions	ID1-3	
11/16	67	a. System of Particles 9.1,9.2	ID1	Pg 188 #1, 3-5
11/17	68	b. Newton's 2 <sup>nd</sup> Law for Systems 9.3-9.5	ID2	Pg 189 #10, 11, 13-15, 23-25
11/18	69	c. Impulse and change in momentum 10.1-10.3	ID2	Pg 209 #2, 5, 7, 10, 16-19
11/19	70	d. Conservation of Momentum 9.6	ID3	Pg 190 #29, 34, 37
11/30	71	e. Inelastic collisions in one dimension 10-4	ID3	Pg 211 #20, 21, 24, 28
12/1	72	f. Elastic collisions 10-5	ID3	Pg 212 #35, 37, 40, 41, 43
12/2	73	g. Collisions 10-6	ID3	Pg 212 #46, 47, 49, 51
12/3	74	h. Systems with a varying mass 9.7	ID3	Pg 190 #43
12/6-8	75-77	i. Lab, review, test		
12/9-13		Semester Review		
12/14		Semester Exam		
	8 day	Chapter 11 – Rotation	IE1,3, 4	
1/3	78	a. Rotation terms and special case formulas 11.1 -11.4	IE1	Pg 239 #3-5, 7, 9, 11-13, 15

1/4	79	b. Relating the linear and angular variables 11.5	IE1	Pg 240 #23, 28
1/5	80	c. Kinetic Energy of Rotation Parallel Axis Theorem 11.6-11.7	IE4	Pg 241 #33-35, 37, 39, 40
1/6	81	d. Torque 11-8	IE3	Pg 241 #45-48
1/7	82	e. Newton's 2 <sup>nd</sup> Law of Motion for rotation 11-9	IE3	
1/10	83	f. Work and Rotational Kinetic Energy 11-10	IE4	Pg 241 #49, 52, 55
1/11	84-85			Pg 241 #59, 61, 62, 64
1/18				
	8days	Chapter 12 – Rolling, Torque, and Angular Momentum	IE2	
1/19	86	a. Rolling 12.1-12.4	IE2a	Pg 269 #1-3, 5, 7-9, 11
1/20	87	b. Torque revisited and angular momentum 12.5, 12.6	IE2a	Pg 269 #18, 19, 20, 21, 24-27
1/21	88		IE2a	Pg 270 #29, 30, 32
1/24	89	c. Newton's 2 <sup>nd</sup> Law in Angular Form 12.7, 12.8	IE2b	Pg 270 #33, 34, 38
1/25	90	d. Angular Momentum of Rigid Body 12.9	IE2	Pg 270 #39, 41-44, 46, 48, 54
1/26-28	91-93	e. Conservation of Angular Momentum 12.10		
		f. Lab,review, test		
	6 days	Chapter 13 – Equilibrium	IE3	
1/31	94	a. Equilibrium 13.1,13.2	IE3	Pg 289 #1, 4-7, 9
2/1	95	b. Center of Gravity, Static equilibrium13.3, 13.4	IE3	Pg 289 #12-20, 23
2/2	96			Pg 289 #25, 26, 28
2/3	97			Ladder Problems Worksheet
2/4-7	98-99	Lab		
	12 days	Chapter 14 – Gravitation	IF4,5	
2/8	100	a. Law of Gravity and Principle of Superposition 14.1 – 14.3	IF4	Pg 316 #1, 3, 4, 8, 9, 11, 12
2/9	101		IF4	Pg 316 #16, 17
2/10	102	b. Gravitation near the Earth's Surface 14.4	IF4	Pg 316 #22, 23
2/11	103		IF4	Pg 316 #26, 29-32

2/14	104	c. Gravitation Inside the Earth 14.5	IF5	Pg 316 #40, 41, 43-48
2/15- 2/22	105- 111	d. Gravitational Potential Energy 14.6 e. Kepler's Law 14.7 f. Lab g. Review and test		
	14 days	Chapter 16 – Oscillations	IF1-3	
2/23	112	a. Terms, Force Laws for Simple Harmonic Motion 16.1-16.3	IF1,2	Pg 365 #1-3, 5, 7, 8, 12, 15, 17, 19
2/24	113		IF1,2	
2/25	114	b. Energy in SHM 16.4	IF1	Pg 367 #32-35, 37, 38
		c. Angular Simple Harmonic Oscillator		Pg 368 #40
2/28	115		IF3	
3/1	116	15.5	IF1,2	Pg 369 #43, 45, 46, 49, 55
3/2	117	d. Pendulums 16.6		Pg 369 #59, 61
		e. SHM and Uniform Circular Motion 16.7	IF1	
3/3	118	f. Damped SHM, Forced Oscillations and Resonance 16.8, 16.9		Pg 369 #63
3/4- 3/11	119- 124	g. Review, Test		
6 weeks 3/21 to test		unit Reviews and progress checks until test		
5/10		Exam		