

Summary of BIOZONE's 3D Approach By Chapter

Science and Engineering Practices (SEPs), Crosscutting Concepts (CCCs), Disciplinary Core Ideas (DCIs), and Performance Expectations (PEs) for Instructional Segments 1-6 of the CA NGSS (Three Course Model): *Physics of the Universe*. A skills chapter, which covers some of the background for Science and Engineering Practices, is also included. Performance Expectations are met within activities and/or the **Summative Assessments** concluding each Instructional Segment (IS).

IS1: FORCES AND MOTION

Page		Activity	Hub	SEP	DCI	CCC	PE
2	1	Start Your Engines		Anchoring phenomenon			
3	2	Motion	✓	2, 3, 4	PS2.A	2	HS-PS2-1
11	3	Forces	✓	2, 4	PS2.A	2	HS-PS2-1
15	4	Newton's Laws of Motion	✓	2, 4, 5	PS2.A	2	HS-PS2-1
23	5	Building Bridges	✓	4, 6, 7	PS2.A, ETS1.A, ETS1.B, ETS1.C	2, 6	HS-ETS1-1, HS-ETS1-2, HS-ETS1-3, HS-ETS1-4
28	6	Momentum	✓	2, 3, 5	PS2.A	2, 4	HS-PS2-2
36	7	Engineering and Forces	✓	1, 5, 6, 7	PS2.A, ETS1.B, ETS1.C	2, 4, 6	HS-PS2-2, HSPS2-3, HS-ETS1-2, HS-ETS1-3
40	8	Forces of the Earth	✓	2, 4, 8	PS2.A	2, 3	HS-PS2-1, (HS-ESS2-1)
43	9	Start Your Engines Revisited					
44	10	Summative Assessment					HS-PS2-1, HS-PS2-2

IS2: FORCES AT A DISTANCE

Page		Activity	Hub	SEP	DCI	CCC	PE
49	11	Let's Go Climbing		Anchoring phenomenon			
50	12	Exploring Gravity	✓	2, 3, 5, 6, 7	PS2.B	1, 3	HS-PS2-4
55	13	Planetary Motion	✓	2, 3, 5	ESS1.B	1, 3, 4, 7	HS-ESS1-4
70	14	Electrostatic Force	✓	2, 3, 5	PS2.B	1, 3, 4	HS-PS2-4
75	15	Atomic Structure and Bonding	✓	2, 3, 6	PS1.A, PS2.B	1, 3, 6, 7	
83	16	Magnetism	✓	3	PS1.A, PS2.B	1	
89	17	Applications of Electromagnetic Forces	✓	2, 3, 6, 8	PS1.A, PS2.B	1, 3, 6, 7	HS-PS2-6
98	18	Let's Go Climbing Revisited					
99	19	Summative Assessment					HS-PS2-4, HS-ESS1-4, HS-PS2-6

IS3: ENERGY CONVERSION AND RENEWABLE ENERGY

Page		Activity	Hub	SEP	DCI	CCC	PE
104	20	The Winds of Change		Anchoring phenomenon			
105	21	Electricity in Daily Life	✓	1, 4, 7	ESS2.D, ESS3.A	5	HS-ESS3-2
117	22	How Do Power Plants Work?	✓	2, 5, 8	PS3.A, PS3.B	4, 5	HS-PS3-1, HS-PS3-2
124	23	Generating Electricity	✓	2, 3, 6	PS3.A, PS3.B, PS3.C	2, 4, 5	HS-PS2-5, HS-PS3-3, HS-PS3-5
129	24	Converting Light to Electricity	✓	8	PS4.B	2, 5, 6	HS-PS4-5
134	25	Evaluating Renewable Power Plants	✓	5, 7, 8	ETS1.B, ESS3.A	3, 5	HSESS3-2
136	26	Engineering Energy Conversion Devices	✓	2	PS3.A, ETS1.A, ETS1.B, ETS1.C	5	HS-PS3-3, ETS1-1, ETS1-2, ETS1-3
139	27	The Winds of Change Revisited					
140	28	Summative Assessment		2, 5	PS3.A, PS3.C, ESS3.C	5, 7	HS-PS3-2, HS-PS3-5, HS-ESS3-3,

IS4: NUCLEAR PROCESSES AND EARTH HISTORY

Page		Activity	Hub	SEP	DCI	CCC	PE
145	29	Powering a 15 Billion km Journey		Anchoring phenomenon			
146	30	A Bit More on Atomic Structure	✓	7	PS1.A, PS1.C	1, 3, 4, 6	HS-PS1-8
150	31	Inside the Nucleus	✓	2	PS1.C	5, 7	HS-PS1-8
153	32	Radioactivity	✓	2, 3, 8	PS1.A, PS1.C	5, 7	HS-PS1-8
163	33	Radioactive Decay and Half-Lives	✓	2	ESS1.C	1	HSESS1-6
168	34	The Age of the Earth	✓	1, 2, 4, 6, 7	ESS1.C, ESS2.A, ESS2.B, PS1.C	1, 7	HS-ESS1-5, HSESS1-6, HS-ESS2-1
186	35	Powering a 15 Billion km Journey Revisited					
187	36	Summative Assessment					HS-PS1-8, HSESS1-6, HS-ESS2-1

IS5: WAVES AND ELECTROMAGNETIC RADIATION

Page		Activity	Hub	SEP	DCI	CCC	PE
189	37	I'm Still Standing	✓	Anchoring phenomenon			
190	38	The Nature of Waves	✓	1, 3, 5	PS4.A	2	HS-PS4-1
196	39	Earthquake Waves	✓	2, 6	ESS2.A, ESS2.B, PS4.A	2	HS-ESS2-1
209	40	The Nature of Light	✓	3, 7, 8	PS4.A, PS4B	2, 4, 5, 7	HS-PS4-3, HS-PS4-4
217	41	Waves and Technology	✓	1, 4, 8	PS4.A, PS4.C	2, 7	HS-PS4-2, HS-PS4-5
225	42	I'm Still Standing Revisited					
226	43	Summative Assessment					HS-PS4-1, HS-ESS2-1

IS6: STARS AND THE ORIGINS OF THE UNIVERSE

Page		Activity	Hub	SEP	DCI	CCC	PE
232	44	Hidden in Plain Sight		Anchoring phenomenon			
233	45	Star Light, Star Bright	✓	2, 4, 6, 8	ESS1.A, PS4.B	1, 2, 3, 4, 5,	HS-ESS1-1, HS-ESS1-3
240	46	The Sun	✓	2, 5, 7	ESS1.A, PS1.C	3, 5, 7	HS-ESS1-1, HS-ESS1-3
246	47	The Life of Stars	✓	2	ESS1.A	4, 5, 7	HS-ESS1-1, HS-ESS1-3
253	48	Origins of the Universe	✓	1, 2, 3, 4, 6, 7, 8	ESS1.A	1, 5	HS-ESS1-2
266	49	Hidden in Plain Sight Revisited					
267	50	Summative Assessment					HS-ESS1-1, HS-ESS1-2, HS-ESS1-3

SEPs: BASIC SKILLS FOR PHYSICS STUDENTS

Page		Activity	Hub	SEP	DCI	CCC	PE
272	51	The Nature of Science	✓	1, 6, 7, 8			NA
274	52	Systems and System Models	✓	2			NA
275	53	Observations and Assumptions		1, 3			
276	54	Measurement and Units	✓	3, 5			NA
279	55	Useful Concepts in Physics		5, 8			
281	56	Accuracy and Precision		3, 4, 5			NA
282	57	Working With Numbers		3, 5			NA
284	58	Graphical Analysis		3, 4, 5, 8			NA
286	59	Describing the Data		3, 4, 5			
288	60	The Periodic Table					