Physics of the Universe:
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 concluding basic 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. All content currently draft and subject to change.

Page		Activity	Hub	SEP	DCI	CCC	PE
1		**IS1: FORCES AND MOTION**					
2	1	Start Your Engines		Anchoring phenomenon			
3	2	Motion	✓	2, 3, 4	PS2.A	2	HS-PS2-1
9	3	Forces	✓	2, 4	PS2.A	2	HS-PS2-1
13	4	Newton's Laws of Motion	✓	2, 4, 5	PS2.A	2	HS-PS2-1
21	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
23	6	Momentum	✓	2, 3, 5	PS2.A	2, 4	HS-PS2-2
31	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
35	8	Forces of the Earth	✓	2, 4, 8	PS2.A	2, 3	HS-PS2-1, (HS-ESS2-1)
38	9	Start Your Engines Revisited					
39	10	Summative Assessment					HS-PS2-1, HS-PS2-2

Page		Activity	Hub	SEP	DCI	CCC	PE
43		**IS2: FORCES AT A DISTANCE**					
44	11	Walking on Water		Anchoring phenomenon			
45	12	Exploring Gravity	✓	2, 5, 6	PS2.B	1, 3	HS-PS2-4
49	13	Planetary Motion	✓	3, 5, 7	ESS1.B	1, 2, 3, 4, 5, 7	HS-ESS1-4
57	14	Electrostatic Force	✓	2,5	PS2.B	1, 5	HS-PS2-4
62	15	Applications of Electromagnetic Forces	✓	2, 3, 6, 8	PS2.2, PS1.B (sec)	1, 3, 6, 7	HS-PS2-6
67	16	Walking on Water Revisited					
68	17	Summative Assessment					TBC

Page		Activity	Hub	SEP	DCI	CCC	PE
72		**IS3: ENERGY CONVERSION AND RENEWABLE ENERGY**					
74	18	The Winds of Change		Anchoring phenomenon			
75	19	Electricity in Daily Life	✓	1, 4	ESS2.D, ESS3.A	5	HS-ESS3-2
80	20	How Do Power Plants Work?	✓	2, 8	PS3.A, PS3.B	4, 5	HS-PS3-1
87	21	Generating Electricity	✓	2, 3, 6, 8	PS3.A, PS3.B, PS3.C	2, 4, 5	HS-PS3-1, HS-PS3-2, HS-PS3-5
96	22	Converting Light to Electricity	✓	8	PS3.D, PS4.B, PS4.C	2, 5, 6	HS-ESS1-2
99	23	Evaluating Renewable Power Plants	✓	5, 7, 8	ETS1.B, ESS3.C	3	HSESS3-4
102	24	Engineering Energy Conversion Devices	✓	2	PS3.A, ETS1.A, ETS1.B, ETS1.C	5	HS-PS3-3, ETS1-1, ETS1-2, ETS1-3, ETS1-4
104	25	The Winds of Change Revisited					
105	26	Summative Assessment					TBC

Page		Activity	Hub	SEP	DCI	CCC	PE
109		**IS4: NUCLEAR PROCESSES AND EARTH HISTORY**					
110	27	Powering a 15 Billion Km Journey		Anchoring phenomenon			
111	28	Atomic Structure	✓	2	PS1.A, PS1.C	6	HS-PS1-8
114	29	Inside the Nucleus	✓	2, 4, 6, 7, 8	PS1.C	2, 3, 6, 7	HS-PS1-8
120	30	Radioactivity	✓	2, 4, 6, 7, 8	PS1.C	5, 7	HS-PS1-8
131	31	The Age of the Earth	✓	1, 2, 4, 5, 7	ESS1.C, ESS2.A, ESS2.B, PS1.C	1, 2, 4	HS-ESS1-5, HSESS1-6, HS-ESS2-1, HS PS1-8
152	32	Powering a 15 Billion Km Journey Revisited					
153	33	Summative Assessment					TBC

Page		Activity	Hub	SEP	DCI	CCC	PE
157		**IS5: WAVES AND ELECTROMAGNETIC RADIATION**					
159	34	I'm Still Standing		Anchoring phenomenon			
160	35	The Nature of Waves	✓	5, 6	PS4..A	5	HS-PS4-1
166	36	Earthquake Waves	✓	1, 2, 4, 5, 7, 8	ESS2.A, ESS2.B, PS4.A	1, 3	HS-ESS2-1, HS-PS4-1
179	37	The Nature of Light	✓	2, 4, 7, 8	PS4.B	5	HS-PS4-3, HS-PS4-4
187	38	Using the Electromagnetic Spectrum	✓	2, 4, 8	PS4.C	5	HS-PS4-2, HS-PS4-5
195	39	I'm Still Standing Revisited					
196	40	Summative Assessment					TBC

Page		Activity	Hub	SEP	DCI	CCC	PE
201		**IS6: STARS AND THE ORIGIN OF THE UNIVERSE**					
202	41	Hidden in Plain Sight		Anchoring phenomenon			
203	42	Star Light, Star Bright	✓	2, 4, 6, 8	ESS1.A, PS4.B	1, 2, 3, 4, 5,	HS-ESS1-1, HS-ESS1-3
210	43	The Sun	✓	2, 5, 7	ESS1.A, PS1.C	3, 5, 7	HS-ESS1-1, HS-ESS1-3
217	44	The Life of Stars	✓	2	ESS1.A	4, 5, 7	HS-ESS1-1, HS-ESS1-3
226	45	Origins of the Universe	✓	1, 2, 3, 4, 6, 7, 8	ESS1.A	1, 5	HS-ESS1-2
235	46	Hidden in Plain Sight Revisited					
236	47	Summative Assessment					HS-ESS1-1, HS-ESS1-2 , HS-ESS1-3

Page		Activity	Hub	SEP	DCI	CCC	PE
240		**SEPs: BASIC SKILLS FOR PHYSICS STUDENTS**					
241	48	Nature of Science	✓	1, 6, 7, 8		4	NA
242	49	Systems and System Models	✓	2, 5		4	NA
244	50	Observations and Assumptions					
245	51	Measurement	✓	2, 3, 6			NA
246	52	Accuracy and Precision		3			NA
247	53	Working With Numbers		5			NA
249	54	Graphical Analysis		4, 5			NA
250	55	Useful Concepts in Physics		5			