

Science Grade 11 F

ShaunScience Grade 11 F

Grade Level Standard(s): Science HS Physical Science 1: Construct an explanation for the outcome of a simple chemical reaction (specific to elements in the families 1, 2, and 13 to 18), based on the outermost electron states of atoms and trends in the periodic table.

Material(s) Provided for Science 11 F	Question(s)	Page Number
Science 11 F Periodic Table	1	4
Science 11 F Attainment Task Questions for Student Use	1	5

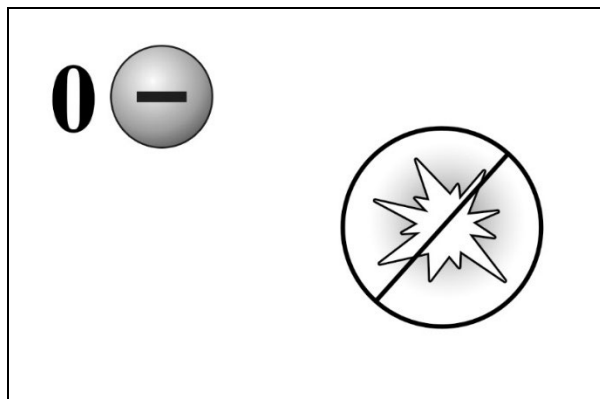
Response Code:

- Indicate the answer provided by the student.

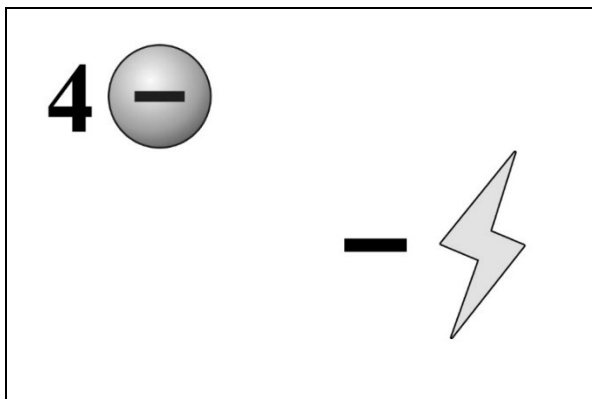
Text Coding:

- “Quotation marks” indicate the script that the teacher should read to the student.
- *Italicized text* provides further direction for the test administrator.
- Words in parenthesis () are optional; they may replace or be read in addition to the word(s) immediately preceding.

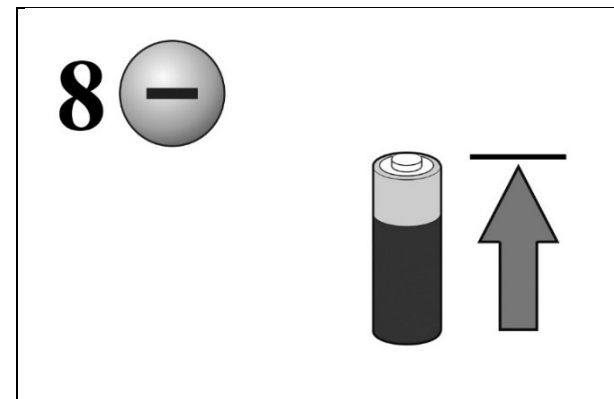
a. Neon (Ne) has no valence electrons and therefore cannot react.



b. (Ne) has 4 valence electrons, which makes it an anion.



c. Neon (Ne) has 8 valence electrons making its outer energy level full.



Science Grade 11 F

Before beginning task administration, please ensure that all conditions specified in the administration protocol (starting on page 12 of the Administration Guide Overview and Attainment Task Administration) have been met. Inform the student that the task is about to start by saying, “We are about to start the task, and I am going to ask you some questions.”

All questions from this task are available for presentation to the student in the supplemental material Science 11 F Attainment Task Questions for Student Use.

“Carla is using the periodic table to explain the outcomes of simple chemical reactions discussed in class. She uses the trends in the table to explain tendencies of elements toward stability.”

Present the student with Science 11 F Periodic Table and ask the following question:

1. “Using the *Periodic Table*, explain why Neon (Ne) is **not** likely to react with other elements.”

Response Option	Response Rationale
a. Neon (Ne) has no valence electrons and therefore cannot react.	<i>The student recognizes Ne as an element on the Periodic Table but does not recognize that it is a noble gas in the last family with 8 valence electrons.</i>
b. Neon (Ne) has 4 valence electrons, which makes it an anion.	<i>The student provides an explanation for why Ne is unlikely to have a chemical reaction with other elements by describing the outer energy level of a noble gas.</i>
c. Neon (Ne) has 8 valence electrons making its outer energy level full. (Correct)	<i>The student provides an explanation for why Ne is unlikely to have a chemical reaction with other elements by describing the outer energy level of a noble gas.</i>
Depth of Knowledge (DOK) 3	

Science Grade 11 F

Science 11 F Periodic Table

1												13					18																																																												
1	2											5	6	7	8	9	10																																																												
H												B	C	N	O	F	Ne																																																												
3	4											13	14	15	16	17	18																																																												
Li	Be											Al	Si	P	S	Cl	Ar																																																												
11	12											31	32	33	34	35	36																																																												
Na	Mg											Ga	Ge	As	Se	Br	Kr																																																												
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																																																												
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr																																																												
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54																																																												
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe																																																												
55	56	*	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86																																																												
Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn																																																												
87	88	**	104	105	106	107	108	109	110	111	112	113	114	115	-	-	-																																																												
Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Uub	Uut	Uuq	Uup	-	-	-																																																												
<table border="1" style="width: 100%; text-align: center;"> <tr> <td>57</td><td>58</td><td>59</td><td>60</td><td>61</td><td>62</td><td>63</td><td>64</td><td>65</td><td>66</td><td>67</td><td>68</td><td>69</td><td>70</td><td>71</td> </tr> <tr> <td>La</td><td>Ce</td><td>Pr</td><td>Nd</td><td>Pm</td><td>Sm</td><td>Eu</td><td>Gd</td><td>Tb</td><td>Dy</td><td>Ho</td><td>Er</td><td>Tm</td><td>Yb</td><td>Lu</td> </tr> <tr> <td>89</td><td>90</td><td>91</td><td>92</td><td>93</td><td>94</td><td>95</td><td>96</td><td>97</td><td>98</td><td>99</td><td>100</td><td>101</td><td>102</td><td>103</td> </tr> <tr> <td>Ac</td><td>Th</td><td>Pa</td><td>U</td><td>Np</td><td>Pu</td><td>Am</td><td>Cm</td><td>Bk</td><td>Cf</td><td>Es</td><td>Fm</td><td>Md</td><td>No</td><td>Lr</td> </tr> </table>																		57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
57	58	59	60	61	62	63	64	65	66	67	68	69	70	71																																																															
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu																																																															
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103																																																															
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr																																																															

Metals
 Non-Metals
 Noble Gases

Science Grade 11 F

Science 11 F Attainment Task Questions for Student Use

1. Using the *Periodic Table*, explain why Neon (Ne) is **not** likely to react with other elements.

Science Grade 11 F

Kentucky Academic Standard: Science HS Physical Science 1: Construct an explanation for the outcome of a simple chemical reaction (specific to elements in the families 1, 2, and 13 -18), based on the outermost electron states of atoms and trends in the periodic table.

Student Group	Number of Students*	Percent Correct
<i>All students</i>	410	46.34%
Gender		
Female	140	43.57%
Male	270	47.78%
Ethnicity		
African American	50	40.00%
American Indian or Alaska Native	<10	Not Reported
Asian	<10	Not Reported
Hispanic or Latino	19	42.11%
Native Hawaiian or Pacific Islander	<10	Not Reported
White (non-Hispanic)	322	47.52%
Two or More Races	10	30.00%
English Learner	20	40.00%
Economically Disadvantaged	322	46.27%

*Number of students that attempted the item