FOR TEACHERS ONLY

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

PS–ES PHYSICAL SETTING/EARTH SCIENCE

Tuesday, January 28, 2003 — 1:15 to 4:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 3 before rating student papers.

Part A and Part B–1
Allow 1 credit for each correct response.

Part A

1 . . . . . **4**	13 . . . . . **4**	25 . . . . . **2** . . . . .
2 . . . . . **2**	14 . . . . . **3**	26 . . . . . **2** . . . . .
3 . . . . . **4**	15 . . . . . **4**	27 . . . . . **1** . . . . .
4 . . . . . **2**	16 . . . . . **4**	28 . . . . . **3** . . . . .
5 . . . . . **3**	17 . . . . . **1**	29 . . . . . **2** . . . . .
6 . . . . . **3**	18 . . . . . **2**	30 . . . . . **4** . . . . .
7 . . . . . **2**	19 . . . . . **3**	31 . . . . . **2** . . . . .
8 . . . . . **3**	20 . . . . . **1**	32 . . . . . **3** . . . . .
9 . . . . . **3**	21 . . . . . **2**	33 . . . . . **1** . . . . .
10 . . . . . **3**	22 . . . . . **1**	34 . . . . . **1** . . . . .
11 . . . . . **1**	23 . . . . . **4**	35 . . . . . **2** . . . . .
12 . . . . . **3**	24 . . . . . **4**	

Part B–1

36 . . . . . **2**	44 . . . . . **3** . . . . .
37 . . . . . **4**	45 . . . . . **2** . . . . .
38 . . . . . **1**	46 . . . . . **2** . . . . .
39 . . . . . **2**	47 . . . . . **4** . . . . .
40 . . . . . **1**	48 . . . . . **1** . . . . .
41 . . . . . **3**	49 . . . . . **4** . . . . .
42 . . . . . **4**	50 . . . . . **4** . . . . .
43 . . . . . **4**	

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Physical Setting/Earth Science examination. Additional information about scoring is provided in the publication *Information Booklet for Administering and Scoring Regents Examinations in the Sciences*.

Use only *red* ink or *red* pencil in rating Regents papers. Do *not* correct the student's work by making insertions or changes of any kind.

On the detachable answer sheet for Part A and Part B–1, indicate by means of a checkmark each incorrect or omitted answer. In the box provided at the end of each part, record the number of questions the student answered correctly for that part.

At least two science teachers must participate in the scoring of each student's responses to the Part B–2 and Part C open-ended questions. Each of these teachers should be responsible for scoring a selected number of the open-ended questions on each answer paper. No one teacher is to score all the open-ended questions on a student's answer paper.

Students' responses must be scored strictly according to the Scoring Key and Rating Guide. For open-ended questions, credit may be allowed for responses other than those given in the rating guide if the response is a scientifically accurate answer to the question and demonstrates adequate knowledge as indicated by the examples in the rating guide. In the student's answer booklet, record the number of credits earned for each answer in the box printed to the right of the answer lines or spaces for that question.

Fractional credit is *not* allowed. Only whole-number credit may be given to a response. Units need not be given when the wording of the questions allows such omissions.

Raters should enter the scores earned for Part A, Part B–1, Part B–2, and Part C on the appropriate lines in the box printed on the answer booklet and then should add these four scores and enter the total in the box labeled "Total Written Test Score." The student's score for the Earth Science Performance Test should be entered in the space provided. Then, the student's raw scores on the performance test and written test should be converted to a scaled score by using the conversion chart printed at the end of this Scoring Key and Rating Guide. The student's scaled score should be entered in the labeled box on the student's answer booklet. The scaled score is the student's final examination score.

All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions that he/she scored in the first rating of the paper. The school principal is responsible for assuring that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

Because scaled scores corresponding to raw scores in the conversion chart may change from one examination to another, it is crucial that for each administration, the conversion chart provided in the scoring key for that administration be used to determine the student's final score. The chart in this scoring key is usable only for this administration of the examination.

Part B–2

Allow a total of 15 credits for this part. The student must answer all questions in this part.

51 **[1]** Allow 1 credit for **California** Current.

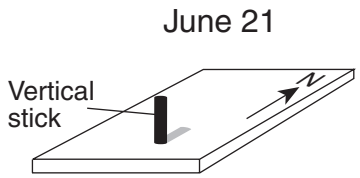
52 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

the higher the Sun, the shorter the shadow

the greater the angle, the shorter the shadow

the lower the Sun's angle, the longer the shadow

53 [1]



Allow 1 credit for drawing a shadow shorter than the height of the vertical stick. The shadow must be drawn extending north, parallel to the north arrow.

54 [1] Allow 1 credit for the trilobites ***Elliptocephala*** or ***Cryptolithus***. Do *not* allow credit for the trilobite *Phacops* or any fossil that is not a trilobite.

55 [1] Allow 1 credit for **phyllite**.

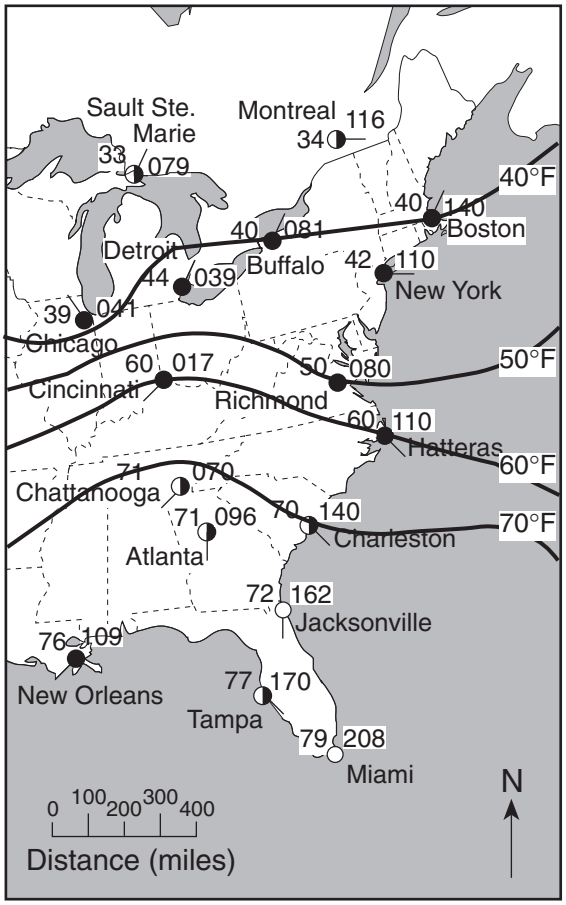
56 [1] Allow 1 credit for a correct response that clearly explains that at this depth and temperature these rock materials would melt. Acceptable responses include, but are not limited to, these examples:

Rocks at a depth of 27 km and at a temperature of 800°C will be melted.

The temperature should be approximately 600°C in order for gneiss to form.

Melted rocks will form igneous rocks.

57 [2]



Allow 2 credits for four correctly drawn isotherms. If more than the four required isotherms are drawn, all isotherms must be correct to receive 2 credits.

Allow only 1 credit for only two or three correctly drawn isotherms.

or

Allow only 1 credit if all four required isotherms are drawn correctly, but extra isotherms are drawn incorrectly.

Note: Allow credit even if the isotherms are not labeled.

Allow credit if the isotherms extend to the edge of the map or if the isotherms extend only to the edge of the continent and not into the ocean.

58 [2] ***a*** Allow no credit for writing the equation.

b Allow 1 credit for correctly substituting both temperature and distance information (±10 miles) into the equation written in part *a*. The student need *not* record the units. Acceptable responses include, but are not limited to, these examples:

$$\text{Gradient} = \frac{10\,\text{F}^\circ\,(^\circ\text{F})}{200\,\text{miles}}$$

$$\text{Gradient} = \frac{10}{200}$$

c Allow 1 credit for correctly calculating the gradient, based on the student's answer in part *b*. Units that are consistent with the student's answer in part *b* must be included to receive credit. Acceptable responses include, but are not limited to, these examples:

$$\text{Gradient} = \frac{0.05\,\text{F}^\circ}{\text{mile}} \text{ or } \frac{0.05^\circ\,\text{F}}{\text{mile}}$$

$$\text{Gradient} = \frac{.05\,\text{F}^\circ}{\text{mile}} \text{ or } \frac{.05^\circ\,\text{F}}{\text{mile}}$$

59 [1] Allow 1 credit for **1020.8** mb.

60 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Temperatures generally decrease as latitude increases.

Temperature and latitude are inversely related.

61 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

The physically weathered sediments are larger in particle size than the chemically weathered particles.

The sand fragments are larger than clay fragments.

The sand fragments range from 0.006 cm to 0.2 cm in diameter and the clay fragments are less than 0.0004 cm in diameter.

62 [1] Allow 1 credit for giving both correct conditions. Acceptable responses include, but are not limited to, this example:

Moisture and temperature should both increase.

63 [1] Allow 1 credit for a correct response. Students must have *three* of the following mineral grains:

plagioclase feldspar

biotite

amphibole

quartz *or* pyroxene

Note: Do *not* allow credit for an answer that includes both quartz and pyroxene.

Part C

Allow a total of 20 credits for this part. The student must answer all questions in this part.

64 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

A shift of light from distant galaxies toward the red end of the spectrum shows galaxies are moving away from Earth.

The red shift shows that the universe is expanding.

65 [1] Allow 1 credit for a correct response. Allow credit for any answer that shows the correct relative-age relationship even if the actual ages are incorrect. Acceptable responses include, but are not limited to, these examples:

Earth and our solar system are younger than the Milky Way galaxy.

The estimated age of Earth and our solar system is 4.6 billion years and these distant galaxies are 12 billion years old.

Our solar system is about 5 billion years old, much younger than these 12-billion-year-old galaxies.

66 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Planet *D* has a much more eccentric orbit than any of the first four planets of our solar system.

The first four planets of our solar system have less eccentric orbits than planet *D*.

67 [1] Allow 1 credit for a correct response that includes when the force is greatest and when the force is least. Acceptable responses include, but are not limited to, this example:

The gravitational pull is greatest when planet *D* is closest to the star and the pull is least when planet *D* is farthest from the star.

68 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Weathering has broken down the rock of the craters.

Erosion has removed the weathered rock of the craters.

Earth's plate tectonics have destroyed surface craters during subduction.

69 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Region: California
Explanation: crustal movement along the San Andreas Fault

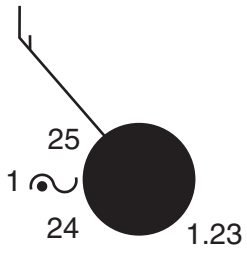
Region: Pacific Northwest Coast
Explanation: A subduction zone is nearby.

70 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, these examples:

Snow is melting and refreezing to sleet as it falls.

The rain freezes as it falls through colder air before it hits the ground.

71 [2]



Allow 2 credits if four or five variables are drawn correctly.

Allow only 1 credit if only two or three variables are drawn correctly.

Note: Feathers may be placed on either side of the staff.

Do *not* allow credit for numbers with labels.

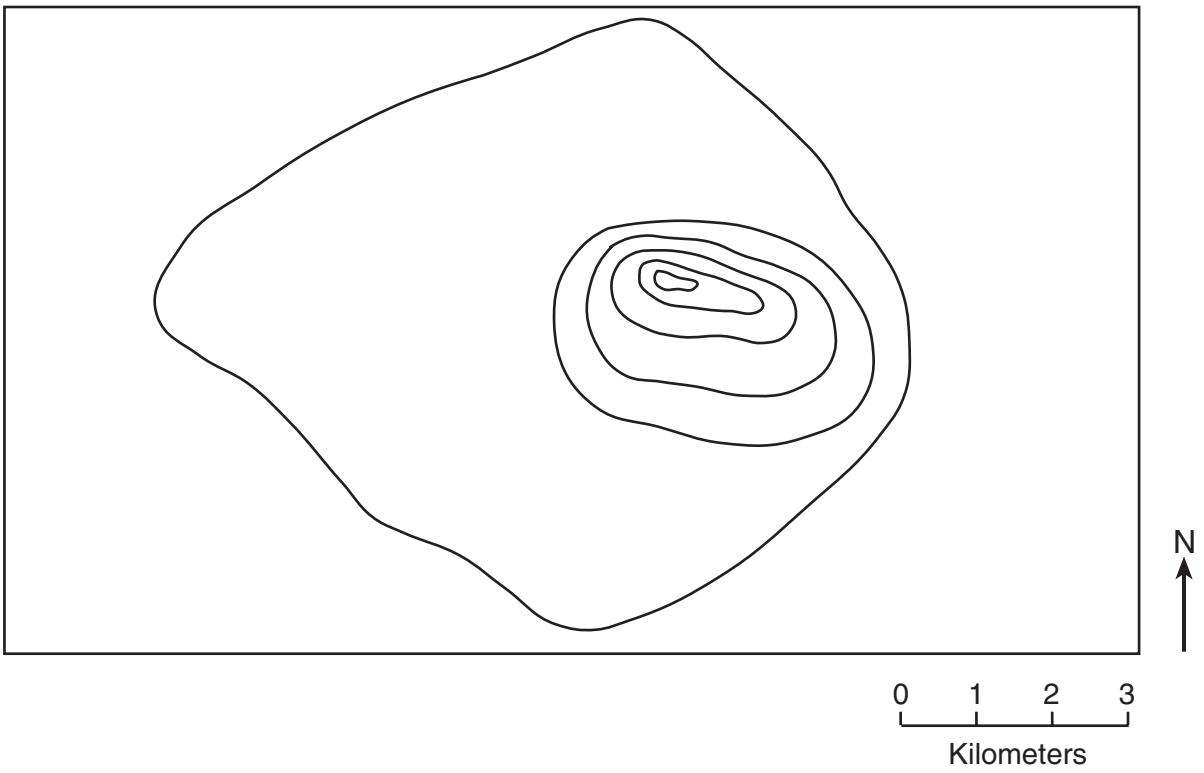
72 [1] Allow 1 credit for **sleet**.

73 [2] Allow 1 credit for indicating that the air rises.

and

Allow 1 credit for indicating that the air cools.

74 [4] An example of a correctly drawn island is shown below.



Allow 1 credit if the island is drawn the correct size (±0.5 cm).

and

Allow 1 credit if the hill is placed on the east side of the island.

and

Allow 1 credit if the contour lines are closest together on the north side of the hill.

and

Allow 1 credit if five closed contour lines are used to indicate the hill on the island. These lines do *not* include the edge of the island.

Note: Allow credit even if the contour lines are not labeled and if a graphic scale is not included.

75 [2] The correct answers are shown below.

Trough *A* = **.3** or **0.3**

Trough *B* = **.4** or **0.4**

Trough *C* = **.6** or **0.6**

Trough *D* = **.7** or **0.7**

Allow 2 credits if three or four answers are calculated correctly.

Allow only 1 credit if only one or two answers are calculated correctly.

Note: Allow credit even if the answers are not rounded to the nearest tenth.

76 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:

to determine the relationship between stream velocity and the slope of a streambed

77 [1] Allow 1 credit for a correct response. Acceptable responses include, but are not limited to, this example:

As the slope of the streambed increases, stream velocity increases.

or

Allow 1 credit for an appropriate response consistent with the student's results calculated in question 75.

Regents Examination in Physical Setting/Earth Science — January 2003
Chart for Determining the Final Examination Score
(Use for January 2003 examination only.)

To determine the student's final examination score, locate the student's total performance test score across the top of the chart and the student's total written test score down the side of the chart. The point where those two scores intersect is the student's final examination score. For example, a student receiving a total performance test score of 14 and a total written test score of 68 would receive a final examination score of 87.

Total Performance Test Score

Total Written Test Score	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
85	100	99	98	97	97	97	97	96	96	95	95	94	94	93	92	92	91	90	89	89	88	87	86	85
84	99	99	98	97	97	97	97	96	96	95	95	94	94	93	92	92	91	90	89	89	88	87	86	85
83	99	98	97	97	96	96	96	95	95	94	94	93	93	92	92	91	90	89	89	88	87	86	85	84
82	99	98	97	97	96	96	96	95	95	94	94	93	93	92	92	91	90	89	89	88	87	86	85	84
81	98	97	96	96	96	95	95	94	94	94	93	93	92	91	91	90	89	89	88	87	86	85	84	83
80	98	97	96	96	96	95	95	94	94	94	93	93	92	91	91	90	89	89	88	87	86	85	84	83
79	97	96	95	95	95	94	94	94	93	93	92	92	91	90	90	89	88	88	87	86	85	84	83	82
78	97	96	95	95	95	94	94	94	93	93	92	92	91	90	90	89	88	88	87	86	85	84	83	82
77	97	96	94	94	94	93	93	93	92	92	91	91	90	90	89	88	88	87	86	85	84	83	83	82
76	96	95	94	93	93	93	92	92	91	91	91	90	89	89	88	87	87	86	85	84	84	83	82	81
75	96	95	94	93	93	93	92	92	91	91	91	90	89	89	88	87	87	86	85	84	84	83	82	81
74	95	94	93	92	92	92	91	91	91	90	90	89	89	88	87	87	86	85	84	84	83	82	81	80
73	95	94	93	92	92	92	91	91	91	90	90	89	89	88	87	87	86	85	84	84	83	82	81	80
72	94	93	92	92	91	91	91	90	90	89	89	88	88	87	86	86	85	84	84	83	82	81	80	79
71	93	92	91	91	90	90	90	89	89	88	88	87	87	86	86	85	84	83	83	82	81	80	79	78
70	93	92	91	91	90	90	90	89	89	88	88	87	87	86	86	85	84	83	83	82	81	80	79	78
69	92	91	90	90	90	89	89	88	88	88	87	87	86	85	85	84	83	83	82	81	80	79	78	77
68	92	90	89	89	89	88	88	88	87	87	86	86	85	85	84	83	83	82	81	80	79	78	77	77
67	91	90	88	88	88	88	87	87	86	86	85	85	84	84	83	82	82	81	80	79	78	78	77	76
66	91	90	88	88	88	88	87	87	86	86	85	85	84	84	83	82	82	81	80	79	78	78	77	76
65	90	89	88	87	87	87	86	86	86	85	85	84	83	83	82	82	81	80	79	78	78	77	76	75
64	89	88	87	86	86	86	85	85	85	84	84	83	83	82	81	81	80	79	78	78	77	76	75	74
63	88	87	86	86	85	85	85	84	84	83	83	82	82	81	80	80	79	78	78	77	76	75	74	73
62	87	86	85	85	84	84	84	83	83	82	82	81	81	80	80	79	78	78	77	76	75	74	73	72
61	86	85	84	84	84	83	83	83	82	82	81	81	80	79	79	78	77	77	76	75	74	73	72	71
60	86	85	83	83	83	82	82	82	81	81	80	80	79	79	78	77	77	76	75	74	73	72	72	71
59	86	85	83	83	83	82	82	82	81	81	80	80	79	79	78	77	77	76	75	74	73	72	72	71
58	85	84	82	82	82	82	81	81	80	80	79	79	78	78	77	76	76	75	74	73	72	72	71	70
57	84	83	82	81	81	81	80	80	80	79	79	78	77	77	76	76	75	74	73	72	72	71	70	69
56	83	82	81	80	80	80	80	79	79	78	78	77	77	76	75	75	74	73	72	72	71	70	69	68
55	82	81	80	80	79	79	79	78	78	77	77	76	76	75	75	74	73	72	72	71	70	69	68	67
54	81	80	79	79	79	78	78	77	77	77	76	76	75	74	74	73	72	72	71	70	69	68	67	66
53	80	79	78	78	78	77	77	77	76	76	75	75	74	73	73	72	71	71	70	69	68	67	66	65
52	80	79	77	77	77	76	76	76	75	75	74	74	73	73	72	71	71	70	69	68	67	66	66	65
51	79	78	77	76	76	76	75	75	74	74	74	73	72	72	71	70	70	69	68	67	67	66	65	64
50	78	77	76	75	75	75	74	74	74	73	73	72	72	71	70	70	69	68	67	67	66	65	64	63
49	77	76	75	75	74	74	74	73	73	72	72	71	71	70	69	69	68	67	67	66	65	64	63	62
48	75	74	73	73	73	72	72	71	71	71	70	70	69	68	68	67	66	66	65	64	63	62	61	60

Regents Examination in Physical Setting/Earth Science — January 2003
Chart for Determining the Final Examination Score
(Use for January 2003 examination only.)

Total Performance Test Score

Total Written Test Score	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
47	75	73	72	72	72	71	71	71	70	70	69	69	68	68	67	66	66	65	64	63	62	61	60	60
46	74	73	71	71	71	71	70	70	69	69	68	68	67	67	66	65	65	64	63	62	61	61	60	59
45	73	72	71	70	70	70	69	69	69	68	68	67	66	66	65	65	64	63	62	61	61	60	59	58
44	72	71	70	69	69	69	68	68	68	67	67	66	66	65	64	64	63	62	61	61	60	59	58	57
43	71	70	69	69	68	68	68	67	67	66	66	65	65	64	63	63	62	61	61	60	59	58	57	56
42	69	68	67	67	67	66	66	66	65	65	64	64	63	62	62	61	60	60	59	58	57	56	55	54
41	69	68	66	66	66	65	65	65	64	64	63	63	62	62	61	60	60	59	58	57	56	55	55	54
40	68	67	65	65	65	65	64	64	63	63	62	62	61	61	60	59	59	58	57	56	55	55	54	53
39	67	66	65	64	64	64	63	63	63	62	62	61	60	60	59	59	58	57	56	55	55	54	53	52
38	65	64	63	63	62	62	62	61	61	60	60	59	59	58	58	57	56	55	55	54	53	52	51	50
37	64	63	62	62	62	61	61	60	60	60	59	59	58	57	57	56	55	55	54	53	52	51	50	49
36	63	62	61	61	61	60	60	60	59	59	58	58	57	56	56	55	54	54	53	52	51	50	49	48
35	63	62	60	60	60	59	59	59	58	58	57	57	56	56	55	54	54	53	52	51	50	49	49	48
34	61	60	59	58	58	58	57	57	57	56	56	55	55	54	53	53	52	51	50	50	49	48	47	46
33	60	59	58	58	57	57	57	56	56	55	55	54	54	53	52	52	51	50	50	49	48	47	46	45
32	58	57	56	56	56	55	55	54	54	54	53	53	52	51	51	50	49	49	48	47	46	45	44	43
31	58	56	55	55	55	54	54	54	53	53	52	52	51	51	50	49	49	48	47	46	45	44	43	43
30	57	56	54	54	54	54	53	53	52	52	51	51	50	50	49	48	48	47	46	45	44	44	43	42
29	55	54	53	52	52	52	51	51	51	50	50	49	49	48	47	47	46	45	44	44	43	42	41	40
28	54	53	52	52	51	51	51	50	50	49	49	48	48	47	46	46	45	44	44	43	42	41	40	39
27	52	51	50	50	50	49	49	49	48	48	47	47	46	45	45	44	43	43	42	41	40	39	38	37
26	52	51	49	49	49	48	48	48	47	47	46	46	45	45	44	43	43	42	41	40	39	38	38	37
25	50	49	48	47	47	47	46	46	46	45	45	44	43	43	42	42	41	40	39	38	38	37	36	35
24	49	48	47	46	46	46	46	45	45	44	44	43	43	42	41	41	40	39	38	38	37	36	35	34
23	47	46	45	45	45	44	44	43	43	43	42	42	41	40	40	39	38	38	37	36	35	34	33	32
22	46	45	44	44	44	43	43	43	42	42	41	41	40	39	39	38	37	37	36	35	34	33	32	31
21	45	44	43	42	42	42	41	41	40	40	40	39	38	38	37	36	36	35	34	33	33	32	31	30
20	44	43	42	41	41	41	40	40	40	39	39	38	38	37	36	36	35	34	33	33	32	31	30	29
19	42	41	40	40	39	39	39	38	38	37	37	36	36	35	35	34	33	32	32	31	30	29	28	27
18	41	40	39	39	39	38	38	37	37	37	36	36	35	34	34	33	32	32	31	30	29	28	27	26
17	40	39	37	37	37	37	36	36	35	35	34	34	33	33	32	31	31	30	29	28	27	27	26	25
16	39	38	37	36	36	36	35	35	35	34	34	33	32	32	31	31	30	29	28	27	27	26	25	24
15	37	36	35	35	34	34	34	33	33	32	32	31	31	30	29	29	28	27	27	26	25	24	23	22
14	35	34	33	33	33	32	32	32	31	31	30	30	29	28	28	27	26	26	25	24	23	22	21	20
13	35	34	32	32	32	31	31	31	30	30	29	29	28	28	27	26	26	25	24	23	22	21	21	20
12	33	32	31	30	30	30	29	29	29	28	28	27	26	26	25	25	24	23	22	21	21	20	19	18
11	31	30	29	29	28	28	28	27	27	26	26	25	25	24	24	23	22	21	21	20	19	18	17	16
10	30	29	28	28	28	27	27	26	26	26	25	25	24	23	23	22	21	21	20	19	18	17	16	15
9	29	28	26	26	26	25	25	25	24	24	23	23	22	22	21	20	20	19	18	17	16	15	15	14
8	27	26	25	24	24	24	23	23	23	22	22	21	21	20	19	19	18	17	16	16	15	14	13	12
7	25	24	23	23	22	22	22	21	21	20	20	19	19	18	18	17	16	15	15	14	13	12	11	10
6	24	23	22	22	22	21	21	20	20	20	19	19	18	17	17	16	15	15	14	13	12	11	10	9
5	23	22	20	20	20	20	19	19	18	18	17	17	16	16	15	14	14	13	12	11	10	10	9	8
4	21	20	19	18	18	18	17	17	17	16	16	15	15	14	13	13	12	11	10	10	9	8	7	6
3	19	18	17	17	16	16	16	15	15	14	14	13	13	12	12	11	10	10	9	8	7	6	5	4
2	18	17	16	16	16	15	15	15	14	14	13	13	12	11	11	10	9	9	8	7	6	5	4	3
1	17	16	14	14	14	14	13	13	12	12	11	11	10	10	9	8	8	7	6	5	4	4	3	2
0	15	14	13	12	12	12	12	11	11	10	10	9	9	8	7	7	6	5	4	4	3	2	1	0

Map to Core Curriculum

January 2003 Physical Setting/Earth Science			
Question Numbers			
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1	16,30	58	68,75
Math Key Idea 2	2,19	37,38,46,52,55, 60	66,67,75,76,77
Math Key Idea 3	1	43,45,53	
Sci. Inq. Key Idea 1	1	62	64,73
Sci. Inq. Key Idea 2		39	
Sci. Inq. Key Idea 3	5,6,8,12,13,17, 18,20,21,22,24, 28,29,30,31,32	36,40,41,42,48, 49,50,52,54,55, 56,59,60,61,63	66,71,72,74,75
Eng. Des. Key Idea 1		39	75,76,77
Standard 2			
Key Idea 1			64,65,72
Key Idea 2			
Key Idea 3			
Standard 6			
Key Idea 1	9	62	69,77
Key Idea 2	5,18,27	39,41,42,47,57, 58,60	70,71,74
Key Idea 3	29	59	74
Key Idea 4	20	44	
Key Idea 5	4,13	37,38	69,75
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2			
Standard 4			
Performance Indicator 1	1,2,3,4,5,8,14, 18,21,31,32,33, 34	36,37,38,39,40, 43,45,49,52,53, 54	64,65,66,67
Performance Indicator 2	6,7,9,10,11,12, 15,19,20,23,24, 25,26,27,28,29, 30	36,41,42,44,46, 47,48,50,57,58, 59,60,61,62	68,69,70,71,72, 73,74,75,76,77
Performance Indicator 3	12,13,16,17,22, 35	55,56,63	
Reference Tables			
ESRT 2001 Edition	3,7,8,12,13,16, 17,21,22,25,34, 35	49,50,54,58,59, 61,63	65,66,71,74,75