FOR TEACHERS ONLY

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

P.S.–E.S. PHYSICAL SETTING/EARTH SCIENCE

Thursday, August 17, 2017 — 8:30 to 11:30 a.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 2 before rating student papers.

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site at: http://www.p12.nysed.gov/assessment/ and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

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

Part A

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

Part B–1

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

Directions to the Teacher

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

Do not attempt to correct the student's work by making insertions or changes of any kind. If the student's responses for the multiple-choice questions are being hand scored prior to being scanned, the scorer must be careful not to make any marks on the answer sheet except to record the scores in the designated score boxes. Marks elsewhere on the answer sheet will interfere with the accuracy of the scanning.

Allow 1 credit for each correct response.

At least two science teachers must participate in the scoring of the Part B–2 and Part C open-ended questions on a student's paper. 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 more than approximately one-half of the open-ended questions on a student's answer paper. Teachers may not score their own students' answer papers.

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. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

Fractional credit is *not* allowed. Only whole-number credit may be given for a response. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

For hand scoring, raters should enter the scores earned in the appropriate boxes printed on the separate answer sheet. Next, the rater should add these scores and enter the total in the space provided. The student's score for the Earth Science Performance Test should be recorded in the space provided. Then the student's raw scores on the written test and the performance test should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Thursday, August 17, 2017. The student's scale score should be entered in the box labeled "Scale Score" on the student's answer sheet. The scale score is the student's final examination score.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score.

Part B–2

Allow a maximum of 15 credits for this part.

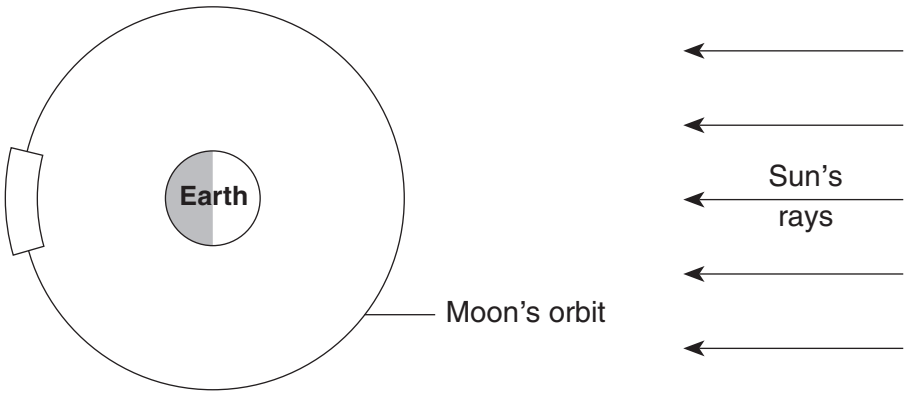
To ensure the accuracy of overlays, select a printer setting such as *full*, *actual size* or *100%* when printing this document. Do ***not*** select the *fit to page* setting.

51 [1] Allow 1 credit for waxing begins at Phase 1 *or* New Moon and waxing ends at Phase 5 *or* Full Moon.

52 [1] Allow 1 credit if the center of the **X** is within or touches the clear banded region shown below.

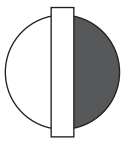
Note: Allow credit if a symbol other than an **X** is used.

It is recommended that an overlay of the same scale as the student answer booklet be used to ensure reliability in rating.



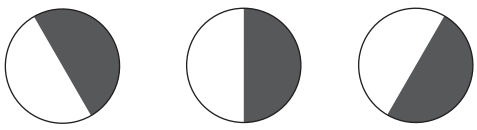
(Not drawn to scale)

53 [1] Allow 1 credit for shading half of the circle on the right side. The edge of the shading should be within or touching the clear rectangle shown below.



Note: It is recommended that an overlay of the same scale as the student answer booklet be used to ensure reliability in rating.

Examples of 1-credit responses:



54 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— mass

— amount of matter in a star

— how massive the star is

— size

Note: Do *not* allow credit for "luminosity" because, even though luminosity is related to the mass of a star, this is not how scientists classify the life cycle of stars based on this flowchart.

55 [1] Allow 1 credit for *Rigel* or *Deneb* or *Betelgeuse* or *Spica* or *Polaris*.

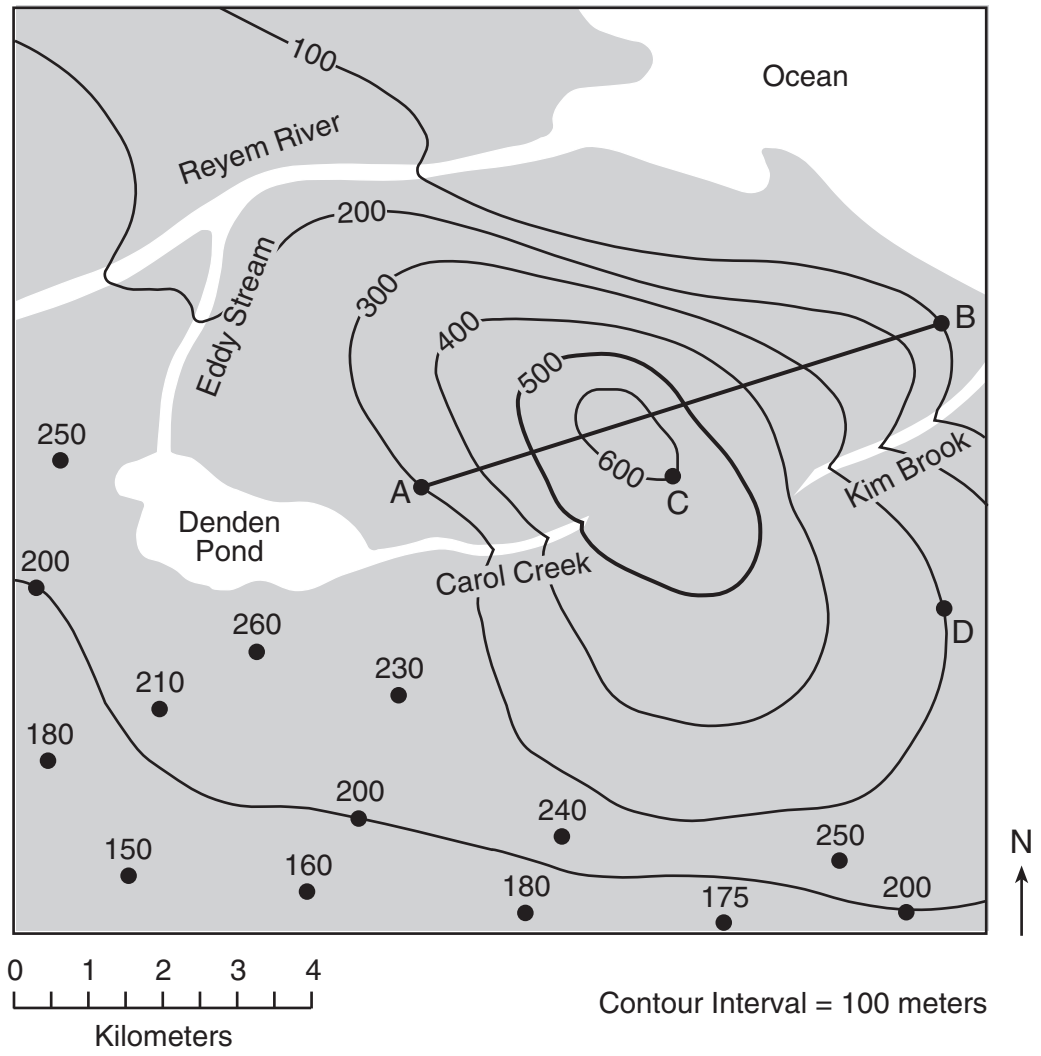
56 [1] Allow 1 credit for fusion *or* nuclear fusion.

57 [1] Allow 1 credit if *both* higher relative surface temperature and greater relative luminosity are circled.

58 [1] Allow 1 credit for correctly drawing the 200-meter contour line extended to the edges of the map.

Note: If additional contour lines are drawn, all must be drawn correctly to receive credit.

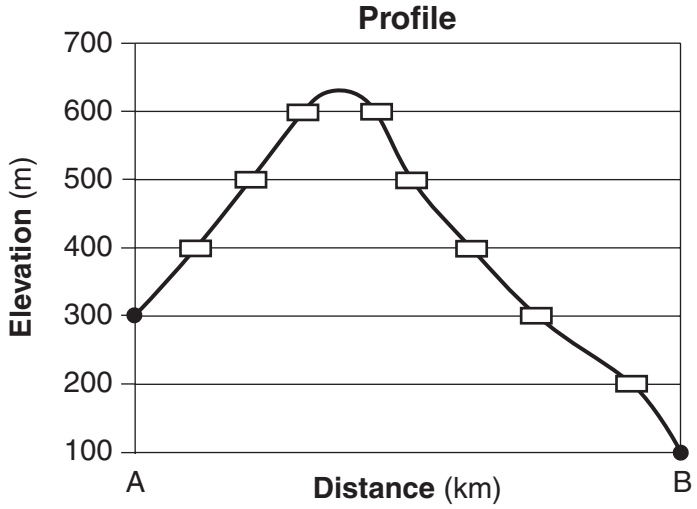
Example of a 1-credit response:



59 [1] Allow 1 credit if the centers of *all eight* student plots are within or touch the clear rectangles shown below and *all ten* plots are correctly connected with a line that passes within or touches the rectangles. The line must show the highest elevation above 600 m, but below 700 m.

Note: Allow credit if the line does not pass through the students plots, but is still within or touches the rectangles.

It is recommended that an overlay of the same scale as the student answer booklet be used to ensure reliability in rating.



60 [1] Allow 1 credit for any value from 73 to 77 *or* −73 to −77 with the correct units. Acceptable responses include, but are not limited to:

— m/km

— meters/kilometers

61 [1] Allow 1 credit if *both* responses are correct. Acceptable responses include, but are not limited to:

Compass direction:

— NE

— east northeast

— NNE

— from SW to NE

Evidence:

— Contour lines bend upstream when they cross Kim Brook.

— Contour lines make a V shape at Kim Brook and the V points uphill.

— The brook flows out of the Vs.

— Kim Brook flows from a higher to a lower elevation.

— Elevations decrease toward the northeast.

— Kim Brook flows to sea level/the ocean.

Note: Do *not* accept "from the SW" only, because this does *not* indicate the direction *toward* which it flows.
Do *not* accept "water flows downhill" because this is given in the question.

62 [1] Allow 1 credit for *both* circling New York City and providing an acceptable explanation. Acceptable responses include, but are not limited to:

— New York City is farther from the epicenter, so there is a greater difference between the arrival of the first *P*-wave and the first *S*-wave.

— As distance to the epicenter increases, the difference in arrival times increases.

— Old Forge is closer to the epicenter near Blue Mountain Lake (*or* Mt. Marcy) so the arrival times are closer together.

Note: Allow credit if New York City is not circled, but is correctly used in the explanation.

All responses must correctly refer to the earthquake epicenter or earthquake origin to receive credit.

63 [1] Allow 1 credit for any value from 2 min 30 s to 2 min 40 s.

64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— gneiss

— quartzite

— marble

— anorthositic rocks

65 [1] Allow 1 credit for *both* outer core and an acceptable characteristic. Acceptable responses include, but are not limited to:

Characteristic of this layer:

— liquid/fluid

— molten rock

— melted iron and nickel

— temperature greater than melting point

Note: Do *not* accept "core" alone because it does not indicate the liquid part of the core.

Part C

Allow a maximum of 20 credits for this part.

66 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— March 19, 20, 21, or 22

— September 21, 22, 23, or 24

— Spring/vernal equinox

— Autumn/fall equinox

— equinox

— 3/20

67 [1] Allow 1 credit for *both* lower and an acceptable explanation. Acceptable responses include, but are not limited to:

Explanation:

— Location *A* is farther from the North Pole, where *Polaris* is directly overhead.

— Location *A* is at a lower latitude.

— closer to the equator

— As latitude decreases, altitude of *Polaris* decreases.

— Location *B* is farther north.

— altitude of *Polaris* = latitude of observer

— They are at different latitudes.

Note: Do *not* allow credit for "location *B* is closer to *Polaris*" or "location *A* is farther from *Polaris*" because all locations on Earth are essentially the same distance from *Polaris*.

68 [1] Allow 1 credit for a response that indicates a time value of 8 a.m. Acceptable responses include, but are not limited to:

— 8:00 a.m.

— 8 a.m.

— 8 o'clock in the morning

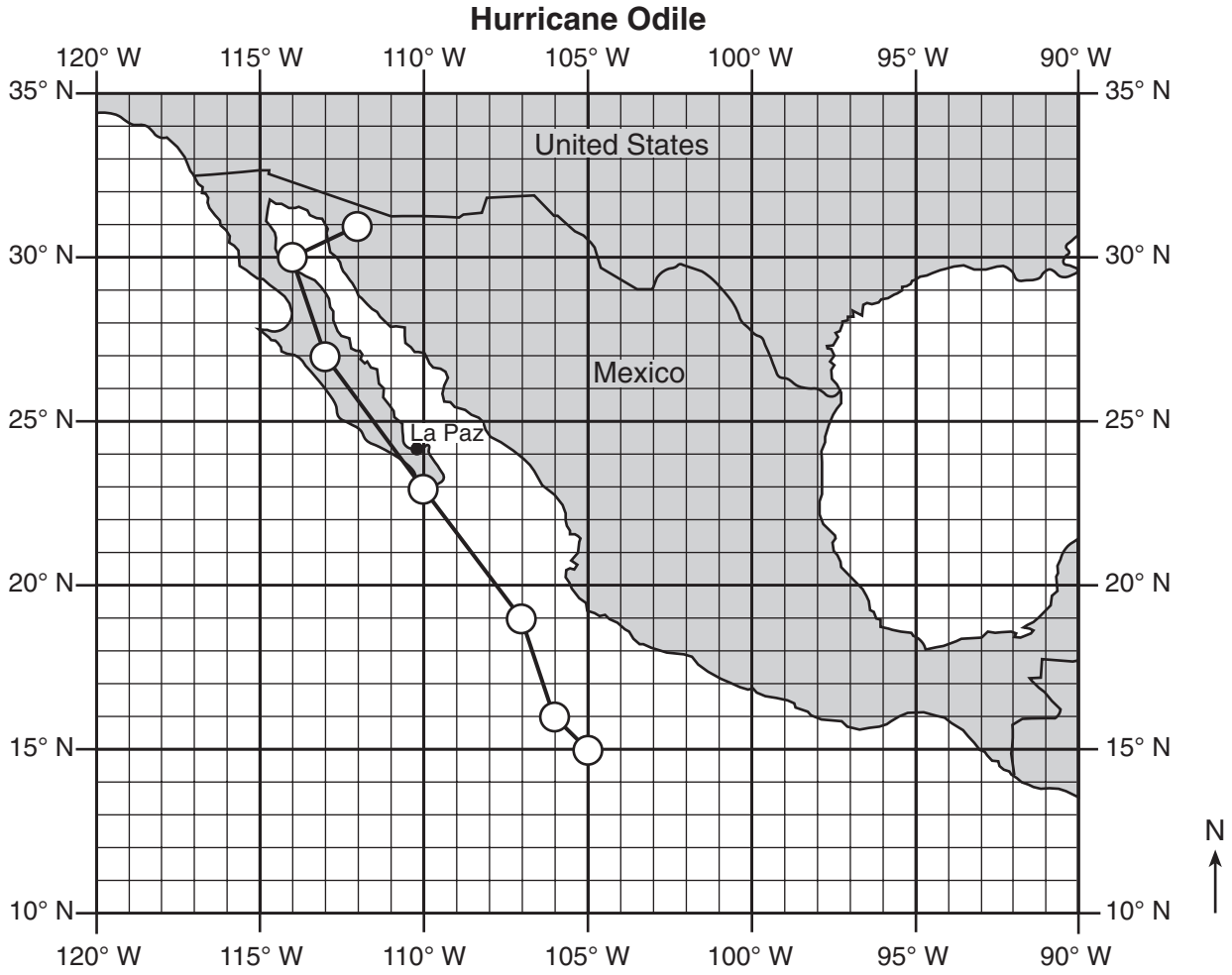
— 0800

69 [1] Allow 1 credit if the centers of *all seven* plots are within or touch the circles shown and are correctly connected with a line that passes within or touches each circle.

Note: Allow credit if the line does *not* pass through the student's plots, but is still within or touches the circles.

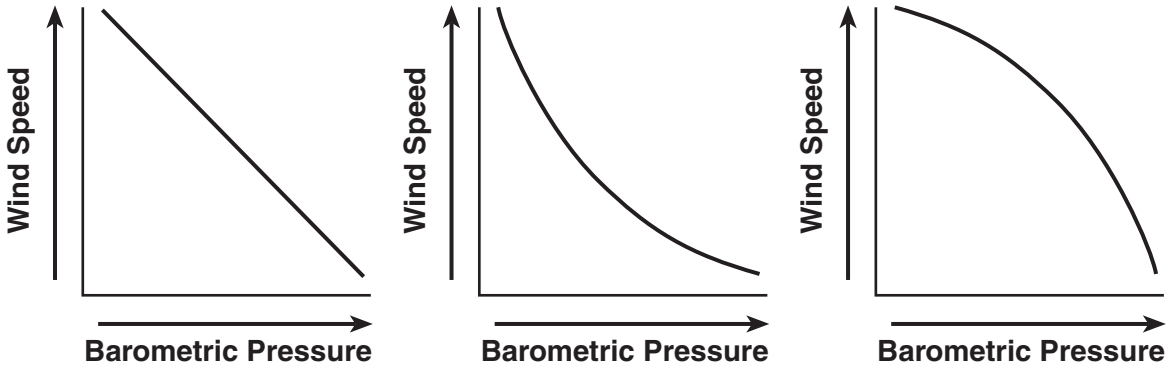
It is recommended that an overlay of the same scale as the student answer booklet be used to ensure reliability in rating.

Example of a 1-credit response:



70 [1] Allow 1 credit for a line that shows a negative slope. Acceptable responses include, but are not limited to:

Examples of 1-credit responses:



71 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— anemometer

— wind speed meter

— wind gauge

— Doppler radar/radar

— pitot tube

72 [1] Allow 1 credit for *two* correct actions. Acceptable responses include, but are not limited to:

— Move to an emergency shelter, shelter or bunker.

— Evacuate./Learn evacuation routes.

— Stock up on supplies of food, water, and medicine.

— Assemble an emergency kit.

— Cover windows./Board up windows.

— Secure outdoor furniture.

— Get a generator./Make sure generator is working.

— Ensure vehicle has full tank of gas.

— Charge or stock up on batteries for electronic equipment.

— Stack sandbags where needed.

73 [1] Allow 1 credit for quartzite *or* hornfels.

74 [1] Allow 1 credit for *two* correct responses. Acceptable responses include, but are not limited to:

— uplift/emergence

— weathering

— erosion

— subsidence/submergence

— deposition

— burial

75 [1] Allow 1 credit for $D \rightarrow$ fault $YY' \rightarrow E \rightarrow F$.

Note: Allow credit for fault, *or* YY' alone, *or* Y alone in place of fault YY'.

Allow credit if the correct rock names are substituted for *D* (gneiss), *E* (diorite) and *F* (basalt).

76 [1] Allow 1 credit for Owasco Lake *or* Keuka Lake.

77 [1] Allow 1 credit for *both* the Quaternary Period and Pleistocene Epoch.

78 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Glacial moraine deposits are unsorted/mixed.

— Glacial deposits in a moraine are unlayered.

— unsorted

— River deposits are sorted.

79 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— V-shaped valleys

— narrow valley bottom with gently sloped sides

80 [1] Allow 1 credit for California Current.

81 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The Pacific Ocean moderates the climate of Long Beach.

— Water has a higher specific heat and temperatures change more slowly.

— Long Beach is near a large body of water.

— Richland is farther inland.

— Long Beach has a marine climate, whereas Richland's is more continental.

— It is located closer to a large body of water.

82 [1] Allow 1 credit for pumice.

83 [1] Allow 1 credit if *both* responses are acceptable. Acceptable responses include, but are not limited to:

Relative color of rock 2:

— Igneous rock 2 is darker/dark.

— blacker/black

— greener/green

— Rock 1 is lighter than rock 2.

Relative density of rock 2:

— Igneous rock 2 has a higher density.

— greater

— more dense/denser

— Rock 1 is less dense than rock 2.

Note: Do *not* accept "more mafic" for either relative color or relative density of rock 2, as this refers to composition.

84 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The rocks may have different environments of formation.

— Diorite is plutonic and andesite is volcanic.

— One forms from cooling magma, and one forms from cooling lava.

— They cooled at different rates.

— They have different grain sizes or textures.

— One is extrusive and one is intrusive.

— They formed differently.

85 [1] Allow 1 credit if *all three* **X**s are only placed in the correct boxes as shown below.

Note: Allow credit if a symbol other than an **X** is used.

Mineral Composition	Found in both rock 1 and rock 2	Found in neither rock 1 nor rock 2	Found in rock 1, only	Found in rock 2, only
$(Na,Ca)AlSi_3O_8$	**X**			
$KAlSi_3O_8$			**X**	
$(Fe,Mg)_2SiO_4$		**X**		

Regents Examination in Physical Setting/Earth Science

August 2017

Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

The *Chart for Determining the Final Examination Score for the August 2017 Regents Examination in Physical Setting/Earth Science* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Thursday, August 17, 2017. Conversion charts provided for previous administrations of the Regents Examination in Physical Setting/Earth Science must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm.
2. Select the test title.
3. Complete the required demographic fields.
4. Complete each evaluation question and provide comments in the space provided.
5. Click the **SUBMIT** button at the bottom of the page to submit the completed form.

Map to Core Curriculum

August 2017 Physical Setting/Earth Science			
	Question Numbers		
Key Ideas/Performance Indicators	Part A	Part B	Part C
Standard 1			
Math Key Idea 1		60	69, 70
Math Key Idea 2	28	49, 51, 63	70, 76
Math Key Idea 3	28		67, 68,
Science Inquiry Key Idea 1	2, 10, 12, 26	36, 39, 47, 48, 50, 55, 56, 65	67, 71, 74, 79, 81
Science Inquiry Key Idea 2			
Science Inquiry Key Idea 3	6, 8, 9, 10, 13, 15, 17, 18, 19, 24, 25, 29, 32, 33, 34, 35	37, 38, 40, 50, 55, 57, 60, 62, 63, 64, 65	66, 73, 77, 80, 82, 83, 84, 85
Engineering Design Key Idea 1			
Standard 2			
Key Idea 1			
Key Idea 2			
Key Idea 3			72
Standard 6			
Key Idea 1	7, 30	45	78
Key Idea 2	6, 9, 17, 20, 23, 26, 27, 30, 31, 32, 34, 35	36, 39, 41, 42, 43, 44, 45, 46, 52, 53, 54, 55, 57, 58, 59, 61, 64	66, 67, 69, 73, 75, 76, 81
Key Idea 3	1		76
Key Idea 4			
Key Idea 5	7, 16, 30	40, 43, 45, 52, 53, 62	79
Key Idea 6			
Standard 7			
Key Idea 1			
Key Idea 2			72
Standard 4			
Key Idea 1	1, 2, 3, 4, 5, 6, 7, 26, 28, 29, 31, 32	36, 37, 39, 40, 41, 42, 43, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57	66, 67, 68, 69, 74, 75, 77, 79
Key Idea 2	8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 27, 30, 34, 35	38, 44, 45, 46, 58, 59, 60, 61, 62, 63, 65	70, 71, 72, 76, 78, 80, 81
Key Idea 3	24, 25, 33	64	73, 82, 83, 84, 85
Reference Tables			
ESRT 2011 Edition (Revised)	8, 9, 10, 11, 13, 15, 18, 19, 24, 25, 29, 32, 33, 34, 35	37, 38, 48, 50, 55, 57, 60, 62, 63, 64, 65	73, 77, 80, 82, 83, 84, 85