

The 2018 PreACT Norming Study

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This document describes the development of the PreACT® norms for PreACT tests administered from fall 2016 to spring 2018, to be used for reporting during the 2019-2020 academic year. Procedures for sample selection, weighting, estimation of weighted percentile ranks, and summary statistics are detailed in this document.

Samples

The norming sample is comprised of students who completed the PreACT tests during the 2016-2017 or 2017-2018 school year and received Composite scale scores. Data from the two-year-combined sample were used to create the norms for each subject (i.e., English, mathematics, reading and science), the STEM score, and the Composite score.¹ Separate norms are estimated for fall and spring test administrations. Students tested from August to January (i.e., August 2016-January 2017 or August 2017-January 2018) were included in the fall norm samples, and those who tested from February to July (i.e., February 2017-July 2017 or February 2018-July 2018) were included in the spring norm samples.

Table 1 presents sample sizes by grade level and season. Separate norms were developed for Fall Grade 9, Spring Grade 9, Fall Grade 10, Spring Grade 10, and Fall Grade 11. Note that norms were not created for other samples due to small sample sizes.

Table 1. Number of Students by Grade Level and Season

Season	Grade Level				
	8	9	10	11	12
Fall	3,868	58,884	557,399	36,625	280
Spring	3,846	47,432	240,736	4,401	122

Weighting Methodology

One purpose of the PreACT test is to simulate the ACT® testing experiences to provide students with practice and preparation for the ACT test. Therefore, the samples used to develop the PreACT norms should be representative of the population of ACT test-takers. A weighting procedure was used to make the PreACT samples similar to the population of ACT test-takers who completed high school in 2018. The weighting variables included gender, race/ethnicity, school geographic region, and school category. School category is defined by public/nonpublic status and percentage of students eligible for free and reduced-price lunch (FRL).



[ACT.org/research](https://www.act.org/research)

For each combination of the weighting variables, the sample and population percentages were first calculated. Then, the weight for each combination was calculated as the population percentage divided by the sample percentage. In the cases where weights were very large (>5) or very small (<0.2), they were truncated to be in the interval of [0.2, 5.0]. The final weights were applied to all students within each combination, and the weighting procedure was conducted separately for each of the five norm samples (Fall Grade 9, Spring Grade 9, Fall Grade 10, Spring Grade 10, and Fall Grade 11). Tables 2-4 show the distributions of the weighting variables for the ACT population and for the weighted and unweighted PreACT samples. The summation of some percentages in the tables presented does not equal 100 due to rounding errors.

Table 2. Summary of the ACT Population and the Grade 9 PreACT Samples

Variable	ACT population (%)	PreACT (Fall Grade 9)		PreACT (Spring Grade 9)	
		Unweighted (%)	Weighted (%)	Unweighted (%)	Weighted (%)
Gender					
Female	51.81	47.40	50.75	49.42	51.31
Male	46.67	50.58	48.26	49.03	47.83
Missing	1.53	2.02	0.99	1.55	0.86
Race/ethnicity					
African American	12.69	10.79	14.63	10.89	13.59
Asian	4.80	4.58	4.14	5.10	4.13
Caucasian	52.05	56.27	53.83	56.01	53.46
Hispanic	16.05	16.52	14.80	16.58	15.70
Other	5.56	5.56	5.40	6.45	5.83
Unknown	8.84	6.29	7.19	4.96	7.29
Region					
Midwest	27.25	55.10	34.23	32.29	30.08
Northeast	7.92	5.80	7.20	2.40	2.91
South	46.76	32.52	47.74	46.24	48.59
West	18.03	6.26	10.75	17.37	18.02
Missing	0.04	0.31	0.09	1.70	0.40
School category					
Nonpublic	11.99	40.14	15.92	37.57	14.08
Public					
0-10% FRL	6.41	5.35	3.27	1.45	2.52
10-20% FRL	10.47	17.17	11.26	5.47	10.19
20-40% FRL	24.94	10.50	23.62	24.63	27.19
40-60% FRL	23.19	9.91	24.15	17.76	25.50
60-80% FRL	13.07	3.93	12.10	3.44	12.12
>80% FRL	6.96	5.92	6.88	2.31	5.71
FRL unknown	1.80	6.93	2.77	7.18	2.64
Public Total	86.84	59.71	84.05	62.23	85.87
Missing	1.16	0.15	0.04	0.20	0.05

Note: FRL means free and reduced-price lunch.

Table 3. Summary of the ACT Population and the Grade 10 PreACT Samples

Variable	ACT population (%)	PreACT (Fall Grade 10)		PreACT (Spring Grade 10)	
		Unweighted (%)	Weighted (%)	Unweighted (%)	Weighted (%)
Gender					
Female	51.81	48.94	51.65	49.21	51.67
Male	46.67	49.73	46.79	48.75	46.74
Missing	1.53	1.33	1.57	2.04	1.59
Race/ethnicity					
African American	12.69	12.78	12.68	14.39	12.79
Asian	4.80	3.86	4.63	4.03	4.71
Caucasian	52.05	51.43	52.27	58.84	52.37
Hispanic	16.05	16.80	16.18	11.92	16.05
Other	5.56	8.34	5.58	5.66	5.58
Unknown	8.84	6.79	8.66	5.15	8.50
Region					
Midwest	27.25	17.84	27.46	24.53	27.34
Northeast	7.92	5.10	7.38	7.72	7.63
South	46.76	64.15	47.01	52.57	46.94
West	18.03	12.44	18.05	14.17	17.87
Missing	0.04	0.47	0.10	1.01	0.22
School category					
Nonpublic	11.99	10.71	12.27	18.95	12.29
Public					
0-10% FRL	6.41	5.19	6.54	4.00	6.12
10-20% FRL	10.47	10.31	10.68	9.78	10.69
20-40% FRL	24.94	24.93	25.46	25.55	25.48
40-60% FRL	23.19	26.25	23.52	23.20	23.46
60-80% FRL	13.07	10.65	12.73	11.10	13.24
>80% FRL	6.96	8.02	6.91	3.24	6.68
FRL unknown	1.80	3.89	1.87	4.13	2.03
Public Total	86.84	89.24	87.71	80.98	87.70
Missing	1.16	0.05	0.01	0.07	0.01

Note: FRL means free and reduced-price lunch.

Table 4. Summary of the ACT Population and the Grade 11 PreACT Sample

Variable	ACT population (%)	PreACT (Fall Grade 11)	
		Unweighted (%)	Weighted (%)
Gender			
Female	51.81	47.97	51.49
Male	46.67	46.70	46.81
Missing	1.53	5.33	1.70
Race/ethnicity			
African American	12.69	10.27	12.79
Asian	4.80	4.35	4.35
Caucasian	52.05	56.76	53.11
Hispanic	16.05	13.35	15.59
Other	5.56	5.61	5.67
Unknown	8.84	9.66	8.50
Region			
Midwest	27.25	41.36	28.05
Northeast	7.92	10.94	7.39
South	46.76	29.11	46.45
West	18.03	16.54	17.66
Missing	0.04	2.06	0.44
School category			
Nonpublic	11.99	20.37	12.79
Public			
0-10% FRL	6.41	4.71	6.35
10-20% FRL	10.47	10.80	10.82
20-40% FRL	24.94	28.14	25.56
40-60% FRL	23.19	19.37	23.46
60-80% FRL	13.07	6.08	12.66
>80% FRL	6.96	4.88	6.02
FRL unknown	1.80	5.50	2.30
Public Total	86.84	79.48	87.17
Missing	1.16	0.15	0.03

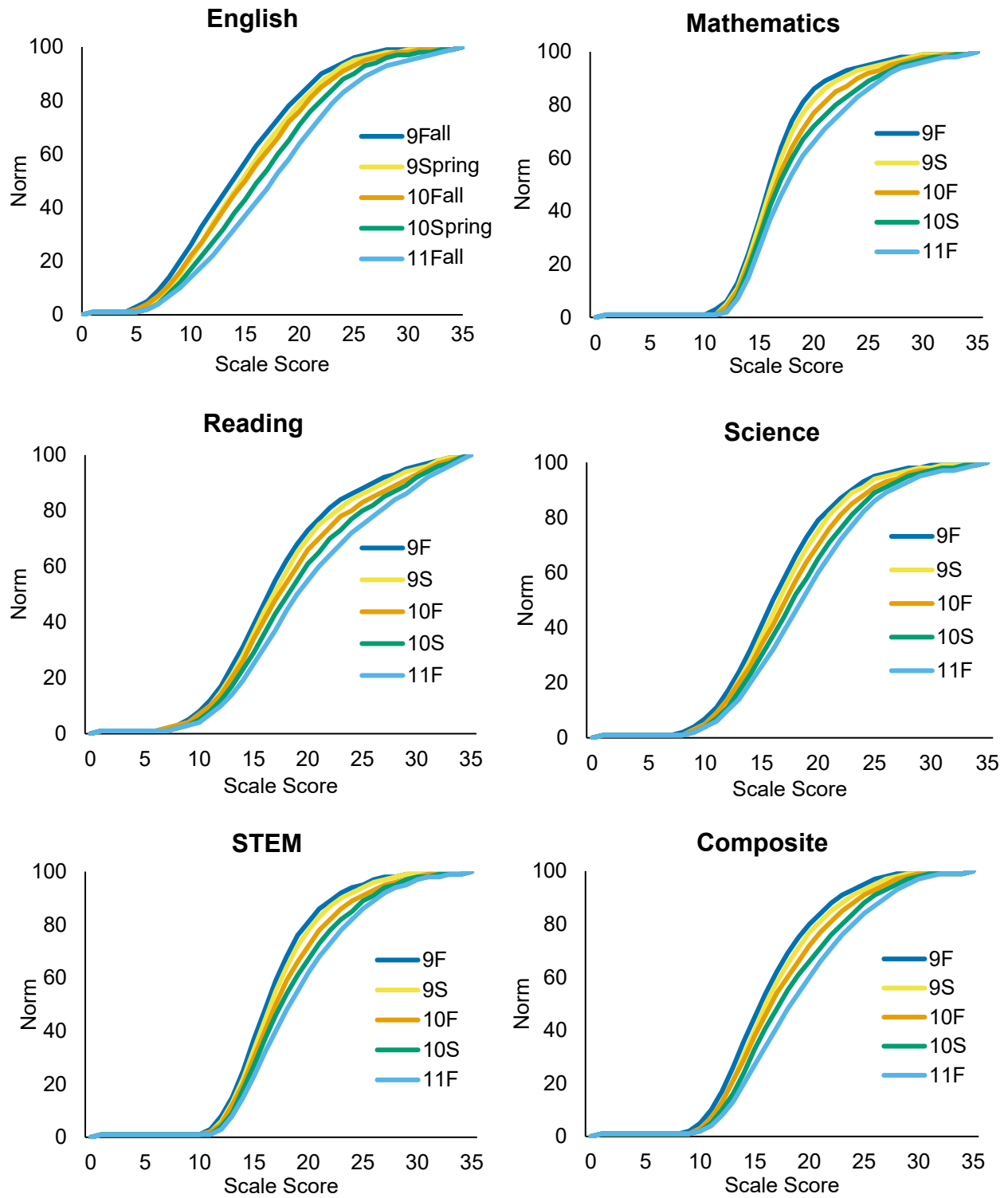
Note: FRL means free and reduced-price lunch.

Estimation of Weighted Percentile Ranks and Summary Statistics

The weighted PreACT norm samples were used to develop norms for each grade level and season combination. A five-degree polynomial smoothing method was applied to the empirical cumulative percentages to reduce sampling error. Tables 5-10 present the cumulative percentages of students who scored at or below each scale score point for English, mathematics, reading, science, STEM, and Composite scales scores, respectively.

Figure 1 shows the comparison of norms across grade levels and seasons. For each scale score point, the cumulative percentage decreases with additional time (grade level and season), meaning that overall achievement level increases from fall 9th grade to fall 11th grade.

Figure 1. Comparisons of 2018 PreACT Norms (Cumulative Percents) Across Grades and Seasons



The mean scale scores for each grade level, season, and subject are shown in Table 11. The mean scale scores were calculated based on the weighted PreACT norm samples.

Table 12 provides the percentages of students meeting the PreACT College Readiness Indicators for each grade, season, and subject² based on the estimated norms (Tables 5-10). PreACT College Readiness Indicators are used to evaluate students' readiness for college through their connection to the ACT College Readiness Benchmarks. The PreACT College Readiness Indicators include three readiness levels (Table 13):

1. **On Target** – students in this range are predicted to have a 50% or higher probability of meeting the ACT College Readiness Benchmark in grade 11.
2. **On the Cusp** – these students have less than a 50% probability but greater than approximately a 25% probability of meeting the ACT College Readiness Benchmark in grade 11.
3. **In Need of Intervention** – these students have less than a 25% chance of meeting the ACT College Readiness Benchmark in grade 11.

The PreACT College Readiness Indicators³ assume that students will take the ACT test 12 to 18 months after taking the PreACT. Because most students take the ACT for the first time in spring of grade 11, the PreACT College Readiness Indicators are most relevant to students who take the PreACT in grade 10.

Table 5. 2018 PreACT English Norms: Percentages of Students at or Below Each Scale Score

PreACT Score	Grade Level and Season				
	9		10		11
	Fall (%)	Spring (%)	Fall (%)	Spring (%)	Fall (%)
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	1	1	1	1	1
5	3	1	2	1	1
6	5	3	4	2	2
7	9	6	7	4	4
8	14	10	11	8	7
9	20	15	16	12	10
10	26	21	22	17	14
11	33	27	27	22	18
12	39	34	33	27	22
13	45	40	39	32	27
14	51	46	45	38	32
15	57	52	50	43	37
16	63	58	56	49	42
17	68	64	61	54	47
18	73	69	66	60	53
19	78	74	72	65	58
20	82	79	76	71	64
21	86	83	81	76	69
22	90	87	85	80	74
23	92	90	88	84	79
24	94	93	91	88	83
25	96	95	93	90	86
26	97	96	95	93	89
27	98	97	96	94	91
28	99	98	97	96	93
29	99	98	98	97	94
30	99	99	98	97	95
31	99	99	99	98	96
32	99	99	99	98	97
33	99	99	99	99	98
34	99	99	99	99	99
35	100	100	100	100	100
N	58,884	47,432	557,399	240,736	36,625

Table 6. 2018 PreACT Mathematics Norms: Percentages of Students at or Below Each Scale Score

PreACT Score	Grade Level and Season				
	9		10		11
	Fall (%)	Spring (%)	Fall (%)	Spring (%)	Fall (%)
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	1	1	1	1	1
5	1	1	1	1	1
6	1	1	1	1	1
7	1	1	1	1	1
8	1	1	1	1	1
9	1	1	1	1	1
10	1	1	1	1	1
11	3	1	1	1	1
12	6	5	4	2	2
13	13	11	10	8	7
14	24	22	20	18	15
15	37	35	31	30	26
16	51	48	44	42	37
17	64	60	55	52	46
18	74	70	64	60	54
19	81	77	71	67	61
20	86	82	77	72	66
21	89	86	81	76	71
22	91	89	85	80	75
23	93	91	87	83	79
24	94	93	90	86	83
25	95	94	92	89	86
26	96	95	93	91	89
27	97	96	95	93	92
28	98	97	96	95	94
29	98	98	97	96	95
30	99	99	98	97	96
31	99	99	98	98	97
32	99	99	99	98	98
33	99	99	99	99	98
34	99	99	99	99	99
35	100	100	100	100	100
N	58,884	47,432	557,399	240,736	36,625

Table 7. 2018 PreACT Reading Norms: Percentages of Students at or Below Each Scale Score

PreACT Score	Grade Level and Season				
	9		10		11
	Fall (%)	Spring (%)	Fall (%)	Spring (%)	Fall (%)
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	1	1	1	1	1
5	1	1	1	1	1
6	1	1	1	1	1
7	2	2	2	1	1
8	3	3	3	2	2
9	5	4	4	3	3
10	8	7	7	5	4
11	12	10	10	8	7
12	17	15	14	12	10
13	24	21	20	17	14
14	31	28	26	23	19
15	39	36	34	29	25
16	47	44	41	36	31
17	55	51	48	43	37
18	62	58	54	49	44
19	68	65	60	55	50
20	73	70	66	61	55
21	77	75	70	65	60
22	81	78	74	70	64
23	84	81	78	73	68
24	86	84	80	77	72
25	88	86	83	80	75
26	90	88	85	82	78
27	92	90	87	85	81
28	93	92	89	87	84
29	95	94	91	89	86
30	96	95	93	92	89
31	97	96	95	94	92
32	98	98	97	96	94
33	99	99	98	97	96
34	99	99	99	99	98
35	100	100	100	100	100
N	58,884	47,432	557,399	240,736	36,625

Table 8. 2018 PreACT Science Norms: Percentages of Students at or Below Each Scale Score

PreACT Score	Grade Level and Season				
	9		10		11
	Fall (%)	Spring (%)	Fall (%)	Spring (%)	Fall (%)
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	1	1	1	1	1
5	1	1	1	1	1
6	1	1	1	1	1
7	1	1	1	1	1
8	2	1	1	1	1
9	4	3	3	2	2
10	7	5	5	4	4
11	11	9	9	7	6
12	17	14	14	11	10
13	24	21	20	17	14
14	32	28	26	23	20
15	41	37	34	30	26
16	50	45	41	37	32
17	58	54	49	44	39
18	66	62	57	52	46
19	73	69	64	58	53
20	79	75	70	65	60
21	83	81	76	71	66
22	87	85	81	76	72
23	90	89	85	81	77
24	93	91	88	85	82
25	95	94	91	89	86
26	96	95	93	91	89
27	97	96	94	93	91
28	98	97	96	95	93
29	98	98	97	96	95
30	99	98	97	97	96
31	99	99	98	98	97
32	99	99	98	98	97
33	99	99	99	99	98
34	99	99	99	99	99
35	100	100	100	100	100
N	58,884	47,432	557,399	240,736	36,625

Table 9. 2018 PreACT STEM Score Norms: Percentages of Students at or Below Each Scale Score

PreACT Score	Grade Level and Season				
	9		10		11
	Fall (%)	Spring (%)	Fall (%)	Spring (%)	Fall (%)
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	1	1	1	1	1
5	1	1	1	1	1
6	1	1	1	1	1
7	1	1	1	1	1
8	1	1	1	1	1
9	1	1	1	1	1
10	1	1	1	1	1
11	3	2	2	1	1
12	8	6	5	4	3
13	15	13	12	9	8
14	25	22	20	18	15
15	37	33	30	27	23
16	48	44	40	37	32
17	59	55	50	46	40
18	68	64	59	54	48
19	76	72	66	61	55
20	81	78	72	67	62
21	86	83	78	73	68
22	89	87	82	78	73
23	92	90	86	82	78
24	94	92	89	85	82
25	95	94	91	89	86
26	97	96	93	91	89
27	98	97	95	94	92
28	98	98	96	95	94
29	99	99	97	97	95
30	99	99	98	98	97
31	99	99	99	98	98
32	99	99	99	99	98
33	99	99	99	99	99
34	99	99	99	99	99
35	100	100	100	100	100
N	58,884	47,432	557,399	240,736	36,625

Table 10. 2018 PreACT Composite Score Norms: Percentages of Students at or Below Each Scale Score

PreACT Score	Grade Level and Season				
	9		10		11
	Fall (%)	Spring (%)	Fall (%)	Spring (%)	Fall (%)
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	1	1	1	1	1
5	1	1	1	1	1
6	1	1	1	1	1
7	1	1	1	1	1
8	1	1	1	1	1
9	2	1	1	1	1
10	5	3	3	2	2
11	10	7	7	5	4
12	17	13	13	10	8
13	26	21	21	16	13
14	36	31	29	24	20
15	45	40	38	33	27
16	54	50	46	41	34
17	62	58	54	48	41
18	69	65	60	55	48
19	75	71	66	61	54
20	80	77	72	66	60
21	84	81	77	71	66
22	88	85	81	76	71
23	91	88	85	80	76
24	93	91	88	84	80
25	95	93	91	88	84
26	97	95	93	91	87
27	98	97	95	93	90
28	99	98	97	95	93
29	99	99	98	97	95
30	99	99	99	98	97
31	99	99	99	99	98
32	99	99	99	99	99
33	99	99	99	99	99
34	99	99	99	99	99
35	100	100	100	100	100
N	58,884	47,432	557,399	240,736	36,625

Table 11. 2018 PreACT Norms: Scale Score Means and Standard Deviations

Grade Level	Season	N		English	Math	Reading	Science	STEM	Composite
9	Fall	58,884	Mean	14.8	17.1	17.7	17.0	16.8	17.3
			SD	5.8	3.9	6.0	4.8	4.6	4.1
	Spring	47,432	Mean	15.6	17.5	18.3	17.5	17.4	17.8
			SD	5.8	4.1	6.1	4.9	4.7	4.2
10	Fall	557,399	Mean	16.0	18.1	18.9	18.2	17.9	18.4
			SD	6.2	4.5	6.5	5.3	5.1	4.6
	Spring	240,736	Mean	17.1	18.7	19.7	18.8	18.7	19.0
			SD	6.3	4.9	6.6	5.4	5.2	4.9
11	Fall	36,625	Mean	18.2	19.3	20.6	19.5	19.5	19.7
			SD	6.7	5.1	6.8	5.6	5.5	5.1

Table 12. 2018 PreACT Norms: Percentages of Students Categorized by PreACT College Readiness Indicator

Subject	College Readiness Indicator	Grade 9		Grade 10		Grade 11
		Fall	Spring	Fall	Spring	Fall
English	In Need of Intervention	33	27	27	22	18
	On the Cusp	18	19	18	16	14
	On Target	49	54	55	62	68
Math	In Need of Intervention	51	48	44	42	37
	On the Cusp	23	22	20	18	17
	On Target	26	30	36	40	46
Reading	In Need of Intervention	47	44	41	36	31
	On the Cusp	21	21	19	19	19
	On Target	32	35	40	45	50
Science	In Need of Intervention	58	54	49	44	39
	On the Cusp	21	21	21	21	21
	On Target	21	25	30	35	40
STEM	In Need of Intervention	86	83	78	73	68
	On the Cusp	6	7	8	9	10
	On Target	8	10	14	18	22

Table 13. Scale Score Ranges for PreACT College Readiness Indicators

PreACT Test	ACT Benchmark	In Need of Intervention Range	On the Cusp Range	On Target Range
English	18	1-11	12-14	15-35
Math	22	1-16	17-18	19-35
Reading	22	1-16	17-19	20-35
Science	23	1-17	18-20	21-35
STEM	26	1-21	22-23	24-35

Notes

1. Unlike the ACT test, the PreACT test does not include an English Language Arts (ELA) score because there is no separate writing test.
2. College Readiness Indicators are provided for English, mathematics, reading, science, and STEM.
3. Additional information about the PreACT College Readiness Indicators is included in the 2017 PreACT Technical Bulletin:
<https://www.act.org/content/dam/act/unsecured/documents/preact-tech-bulletin-2017.pdf>

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Yang Lu is a senior psychometrician in the Assessment Transformation department. She specializes in multidimensional IRT, test equating, and educational measurement theories.

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