The PreACT® 2017 Norming Study

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This document describes the development of the PreACT® 2017 norms for PreACT tests administered from fall 2016 to spring 2017. 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 PreACT tests during the 2016–2017 school year and received Composite scale scores. Data from this 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] Consistent with the ACT Plan® national norming study,[2] fall and spring norm samples were separately created for the PreACT. Students tested in or before January 2017 were included in the fall norm samples, and those who tested after January 2017 in the spring norm samples.

Table 1 presents sample sizes across grade levels and semesters. Separate norms were developed for Fall Grade 9, Spring Grade 9, Fall Grade 10, Spring Grade 10, and Fall Grade 11. Note that no norms were created for other samples due to small sample sizes.

Table 1. Number of Students by Grade Level and Semesters

Semester	Grade Level				
	8	9	10	11	12
Fall	1,794	22,074	275,794	13,894	125
Spring	1,459	19,881	85,088	2,186	76

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. The PreACT scale scores range from 1–35 while the ACT scale scores range from 1–36. A weighting procedure was used to make the PreACT samples similar to the population of ACT test takers who completed high school in 2017. The weighting variables included gender, race/ethnicity, school geographic region, and school category. School category is defined by public/nonpublic

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status and percentage of students eligible for free and reduced-price lunch (FRL).

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).

Weights were applied to students in each sample to ensure that each sample was similar to the population of ACT test takers with respect to the weighting variables. Tables 2–4 show the distributions of the weighting variables for the ACT population and for the weighted and unweighted PreACT samples.

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	51.58	47.83	49.90	49.83	51.48
Male	46.29	50.83	49.05	48.92	47.56
Missing	2.12	1.35	1.05	1.26	0.95
Race/ethnicity					
African American	12.65	8.60	9.92	11.65	13.91
Asian	4.73	4.26	4.40	4.33	3.80
Caucasian	52.34	58.77	57.57	52.86	54.19
Hispanic	17.14	17.46	17.00	20.73	16.15
Other	5.36	5.40	5.04	5.13	5.45
Unknown	7.79	5.51	6.07	5.30	6.50
Region					
Midwest	27.59	53.35	38.23	29.70	28.44
Northeast	8.43	4.51	6.25	2.27	3.05
South	44.39	33.21	37.15	49.16	48.84
West	19.55	8.39	18.21	16.84	19.18
Missing	0.05	0.54	0.16	2.03	0.50
School category					
Nonpublic	11.56	47.99	18.88	36.51	14.49
Public					
0–10% FRL	6.59	0.73	4.21	1.72	2.82
10–20% FRL	10.70	18.38	11.91	4.91	10.59
20–40% FRL	24.26	8.95	24.09	20.06	27.95
40–60% FRL	22.48	8.36	18.16	14.95	22.27
60–80% FRL	13.34	3.02	9.62	2.88	10.00
>80% FRL	7.27	3.81	8.87	5.79	7.13
FRL unknown	2.65	8.65	4.23	12.98	4.70
Public Total	87.29	51.90	81.09	63.29	85.46
Missing	1.14	0.11	0.03	0.19	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	51.58	48.86	51.69	49.62	51.51
Male	46.29	50.01	46.79	48.61	46.60
Missing	2.12	1.13	1.52	1.78	1.88
Race/ethnicity					
African American	12.65	12.77	12.77	10.71	12.70
Asian	4.73	3.62	4.38	4.49	4.52
Caucasian	52.34	50.21	52.97	60.07	52.72
Hispanic	17.14	16.39	17.32	13.98	17.31
Other	5.36	8.27	5.45	5.56	5.39
Unknown	7.79	8.73	7.13	5.19	7.37
Region					
Midwest	27.59	16.94	27.66	30.44	27.83
Northeast	8.43	4.38	7.74	10.41	8.12
South	44.39	65.73	45.02	40.09	44.21
West	19.55	12.48	19.48	17.82	19.56
Missing	0.05	0.48	0.10	1.25	0.28
School category					
Nonpublic	11.56	10.33	12.05	24.36	12.18
Public					
0–10% FRL	6.59	5.78	6.84	5.51	5.33
10–20% FRL	10.70	9.87	11.08	7.29	11.02
20–40% FRL	24.26	23.22	24.91	27.46	25.35
40–60% FRL	22.48	27.55	22.93	16.56	22.94
60–80% FRL	13.34	12.78	12.72	7.95	13.67
>80% FRL	7.27	6.04	7.14	4.81	6.66
FRL unknown	2.65	4.38	2.33	5.98	2.84
Public Total	87.29	89.62	87.95	75.56	87.81
Missing	1.14	0.04	0.01	0.08	0.02

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	51.58	47.38	51.53
Male	46.29	46.24	46.22
Missing	2.12	6.38	2.25
Race/ethnicity			
African American	12.65	8.29	11.43
Asian	4.73	3.71	4.20
Caucasian	52.34	60.00	55.39
Hispanic	17.14	11.38	15.93
Other	5.36	5.38	5.31
Unknown	7.79	11.24	7.74
Region			
Midwest	27.59	35.00	29.28
Northeast	8.43	16.78	8.43
South	44.39	28.66	41.23
West	19.55	18.53	20.82
Missing	0.05	1.03	0.23
School category			
Nonpublic	11.56	28.62	13.32
Public			
0–10% FRL	6.59	6.63	5.49
10–20% FRL	10.70	9.18	11.40
20–40% FRL	24.26	21.28	26.18
40–60% FRL	22.48	18.97	24.27
60–80% FRL	13.34	6.27	10.26
>80% FRL	7.27	4.15	6.65
FRL unknown	2.65	4.79	2.41
Public Total	87.29	71.27	86.66
Missing	1.14	0.12	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 and semester combination. A 5-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 the grades and semesters by subjects. It is noted that for the same scale score, the cumulative percentage decreases with additional time (grade and semester), meaning that the overall ability level of each sample increases from fall 9th grade to fall 11th grade. The mean scale scores for each grade/semester and subject are shown in Table 11. The mean scale scores were calculated based on the weighted PreACT norm samples.

Tables 12 and 13 provide the percentages of students meeting the PreACT College Readiness Indicators for each grade/semester and subject[3] based on the PreACT 2017 testing samples (Table 12) and based on the 2017 PreACT norm tables (Table 13). 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 14), which are defined as follows:

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 Indicators[4] assume that students will take the ACT test 12–18 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. 2017 PreACT English Norms: Percentage of Students at or Below Each Scale Score

PreACT Score	Grade/Semester				
	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	2	2	2	1	1
6	5	4	4	2	2
7	8	7	7	5	4
8	13	11	12	8	6
9	19	16	17	12	9
10	24	21	22	17	13
11	31	27	28	21	17
12	37	33	34	26	21
13	43	39	39	32	26
14	48	44	45	37	31
15	54	50	50	42	36
16	59	56	55	47	41
17	65	61	60	52	46
18	70	66	65	58	51
19	75	71	70	63	57
20	79	76	75	68	62
21	83	80	79	73	68
22	87	84	83	78	73
23	90	88	87	82	78
24	93	91	90	86	82
25	95	93	92	89	86
26	96	95	94	91	89
27	97	96	96	93	91
28	98	97	97	95	93
29	99	98	97	96	94
30	99	98	98	97	96
31	99	99	98	98	97
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	22,074	19,881	275,794	85,088	13,894

Table 6. 2017 PreACT Mathematics Norms: Percentage of Students at or Below Each Scale Score

| | Grade/Semester | | | | |
| | 9 | | 10 | | 11 |
PreACT Score	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	1	1	1	1	1
12	4	3	4	2	1
13	11	10	10	7	4
14	22	20	19	16	13
15	36	34	31	29	24
16	51	48	44	41	36
17	63	60	56	52	46
18	73	69	66	60	55
19	81	77	74	67	61
20	86	82	79	72	67
21	89	86	84	77	72
22	92	89	87	81	76
23	93	91	89	84	80
24	95	93	91	87	84
25	96	94	93	90	87
26	97	96	94	92	90
27	97	97	95	94	93
28	98	98	96	96	95
29	99	98	97	97	96
30	99	99	98	97	97
31	99	99	99	98	98
32	99	99	99	98	98
33	99	99	99	99	99
34	99	99	99	99	99
35	100	100	100	100	100
N	22,074	19,881	275,794	85,088	13,894

Table 7. 2017 PreACT Reading Norms: Percentage of Students at or Below Each Scale Score

| PreACT Score | Grade/Semester | | | | |
| | 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	1	2	1	1
8	3	2	3	2	1
9	5	4	4	3	2
10	8	7	7	5	4
11	12	11	11	8	6
12	18	16	16	13	10
13	25	23	22	18	14
14	32	30	29	24	20
15	41	38	37	31	26
16	49	46	45	38	33
17	57	54	52	46	40
18	64	61	59	52	47
19	70	67	65	59	53
20	75	72	70	64	59
21	80	77	74	69	64
22	83	80	78	73	69
23	86	83	81	77	73
24	88	86	84	80	76
25	90	88	86	83	79
26	92	90	88	85	82
27	93	91	90	87	85
28	94	93	91	89	87
29	95	94	93	91	89
30	97	96	94	93	92
31	97	97	96	95	94
32	98	98	97	96	96
33	99	99	98	98	97
34	99	99	99	99	99
35	100	100	100	100	100
N	22,074	19,881	275,794	85,088	13,894

Table 8. 2017 PreACT Science Norms: Percentage of Students at or Below Each Scale Score

| PreACT Score | Grade/Semester | | | | |
| | 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	3	3	3	2	2
10	6	6	6	4	3
11	10	10	9	8	6
12	16	15	14	12	9
13	23	21	21	17	14
14	31	29	27	23	19
15	39	37	35	30	25
16	47	45	42	37	31
17	55	53	50	44	38
18	63	61	57	51	45
19	70	68	64	58	53
20	76	74	70	64	60
21	81	79	76	70	66
22	85	84	81	76	73
23	89	88	85	81	78
24	92	90	88	85	83
25	94	93	91	88	86
26	95	94	93	91	89
27	97	96	94	93	92
28	97	97	95	94	93
29	98	97	96	95	95
30	98	98	97	96	96
31	99	98	98	97	96
32	99	99	98	97	97
33	99	99	99	98	98
34	99	99	99	99	99
35	100	100	100	100	100
N	22,074	19,881	275,794	85,088	13,894

Table 9. 2017 PreACT STEM Score Norms: Percentage of Students at or Below Each Scale Score

	Grade/Semester				
	9		**10**		**11**
PreACT Score	**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	2	2	2	1	1
12	6	6	6	4	3
13	13	12	12	9	7
14	24	21	21	17	14
15	35	32	31	26	22
16	47	44	41	36	30
17	58	54	51	45	39
18	66	63	60	54	47
19	74	71	67	61	55
20	80	77	74	67	62
21	84	82	79	73	68
22	88	86	83	78	74
23	91	89	87	82	79
24	94	92	89	86	83
25	95	94	92	89	87
26	97	95	94	91	90
27	98	97	95	94	92
28	98	98	97	95	94
29	99	98	98	97	96
30	99	99	98	97	97
31	99	99	99	98	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	22,074	19,881	275,794	85,088	13,894

Table 10. 2017 PreACT Composite Score Norms: Percentage of Students at or Below Each Scale Score

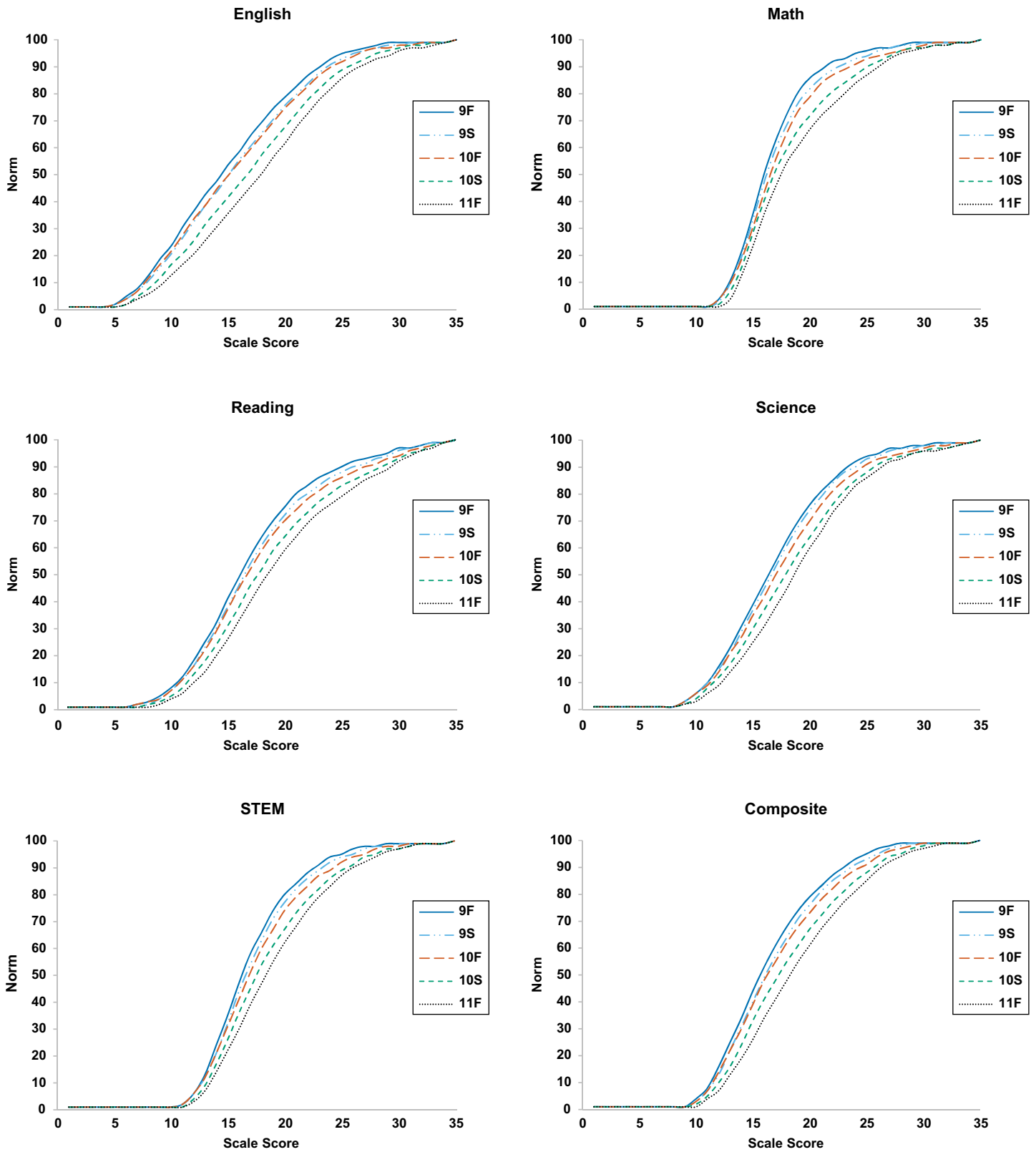| PreACT Score	Grade/Semester				
	9		10		11
	Fall (%)	Spring (%)	Fall (%)	Spring (%)	Fall (%)
1	1	1	1	1	1
2	1	1	1	1	1
3	1	1	1	1	1
4	1	1	1	1	1
5	1	1	1	1	1
6	1	1	1	1	1
7	1	1	1	1	1
8	1	1	1	1	1
9	1	1	1	1	1
10	4	3	3	2	1
11	8	7	7	5	4
12	16	13	14	10	7
13	25	22	22	16	13
14	34	31	30	24	19
15	44	40	39	33	26
16	53	49	48	41	34
17	61	57	55	48	41
18	68	64	62	55	48
19	74	71	68	61	55
20	79	76	73	67	61
21	83	81	78	72	67
22	87	85	82	77	72
23	90	88	86	81	77
24	93	91	89	85	81
25	95	93	91	88	85
26	97	95	94	91	89
27	98	97	96	94	92
28	99	98	97	95	94
29	99	99	98	97	96
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	22,074	19,881	275,794	85,088	13,894

Figure 1. Comparisons of 2017 PreACT norms across grades and semesters

Table 11. National Average Scale Scores Using 2017 PreACT Weighted Norm Sample

Grade	Semester	N		English	Math	Reading	Science	STEM	Composite
9	Fall	22,074	Mean	15.3	17.2	17.4	17.4	17.5	17.0
			SD	5.1	3.1	4.8	4.2	3.4	3.8
	Spring	19,881	Mean	16.0	17.6	18.0	17.7	17.9	17.4
			SD	5.6	3.6	5.4	4.7	3.8	4.3
10	Fall	275,794	Mean	16.0	17.9	18.3	18.1	18.3	17.7
			SD	6.2	4.2	6.1	5.3	4.5	4.9
	Spring	85,088	Mean	17.4	18.6	19.2	18.9	19.0	18.6
			SD	6.4	4.6	6.2	5.5	4.7	5.1
11	Fall	13,894	Mean	18.4	19.3	20.0	19.5	19.7	19.4
			SD	6.3	4.6	6.1	5.3	4.7	5.0

Table 12. Percentage of Students Categorized by PreACT College Readiness Indicator in the PreACT 2017 Test Samples

Subject	College Readiness Indicator	Grade 9		Grade 10		Grade 11
		Fall (%)	Spring (%)	Fall (%)	Spring (%)	Fall (%)
English	In Need of Intervention	26	26	31	19	15
	On the Cusp	14	14	15	12	11
	On Target	59	60	54	68	74
Math	In Need of Intervention	50	50	51	39	32
	On the Cusp	22	21	20	20	20
	On Target	28	29	29	42	49
Reading	In Need of Intervention	47	47	49	37	31
	On the Cusp	17	17	16	16	16
	On Target	36	36	35	47	53
Science	In Need of Intervention	50	50	52	40	34
	On the Cusp	21	20	18	19	19
	On Target	29	30	30	41	48
STEM	In Need of Intervention	81	80	79	68	61
	On the Cusp	8	8	8	11	12
	On Target	10	12	13	21	27

Table 13. Percentage of Students Categorized by PreACT College Readiness Indicator from the 2017 PreACT Norm Tables

Subject	College Readiness Indicator	Grade 9		Grade 10		Grade 11
		Fall (%)	Spring (%)	Fall (%)	Spring (%)	Fall (%)
English	In Need of Intervention	31	27	28	21	17
	On the Cusp	17	17	17	16	14
	On Target	52	56	55	63	69
Math	In Need of Intervention	51	48	44	41	36
	On the Cusp	22	21	22	19	19
	On Target	27	31	34	40	45
Reading	In Need of Intervention	49	46	45	38	33
	On the Cusp	21	21	20	21	20
	On Target	30	33	35	41	47
Science	In Need of Intervention	55	53	50	44	38
	On the Cusp	21	21	20	20	22
	On Target	24	26	30	36	40
STEM	In Need of Intervention	84	82	79	73	68
	On the Cusp	7	7	8	9	11
	On Target	9	11	13	18	21

Table 14. 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. *Note:* Unlike the ACT, the PreACT does not include an ELA score because there is no separate writing test.

2. Additional information about the ACT Plan® national norming study is included in *ACT Plan technical manual* (ACT, 2013b).

3. College Readiness Indicators are provided for English, mathematics, reading, science, and STEM.

4. Additional information about the PreACT College Readiness Indicators is included in the 2017 PreACT technical bulletin at the ACT website: https://www.act.org /content/dam/act/unsecured/documents /preact-tech-bulletin-2017.pdf.

References

ACT. (2013b). *The ACT Plan® technical manual: 2013–2014*. Iowa City, IA: ACT.