The 2023 PreACT 8/9 Norming Study

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This document describes the development of the PreACT® 8/9 norms for PreACT 8/9 tests administered from fall 2020 to spring 2023, to be used for reporting during the 2023–2024 academic year. Norms will be updated every summer for the next reporting year.

The results of the norming study are used to report the percentile ranks associated with students' PreACT 8/9 scale scores, as shown in Figure 1. The US ranks allow students to understand how their performance compares to that of other students in the population. For example, a Composite rank of 68 indicates that a student's Composite score was as high as or higher than the scores of 68% of the students in the population.

Figure 1. Norm Percentile Ranks in the Sample Student Report

US Rank ———

Composite	68%
Math	74%
Science	50%
STEM	60%
English	70%
Reading	74%

Procedures for sample selection, weighting, estimation of weighted percentile ranks, and summary statistics are detailed in this document.

Samples

The norming sample comprises students who completed PreACT 8/9 during the 2020–2021, 2021–2022, or 2022–2023 school year and received Composite scale scores. Data from the combined three-year sample were used to create the norms for each subject (English, math, reading, and science), for the STEM score, and for the Composite score.[1] Separate norms were estimated for fall and spring test administrations. Students who tested from August to January (August 2020–January 2021, August 2021–January 2022, or August 2022–January 2023) were included in the fall norm sample, and those who tested from February to July (February 2021–July 2021, February 2022–July 2022, or February 2023–July 2023) were included in the spring norm sample.

The sample size (*N* count) for each year is presented in Table 1.

Table 1. Final Sample Size per Year

Year	*N*
2020–2021	75,895
2021–2022	191,526
2022–2023	215,863
Total	483,284

Table 2 presents sample sizes by grade level and season. Separate norms were developed for Fall Grade 8, Spring Grade 8, Fall Grade 9, and Spring Grade 9. Note that norms were not created for other samples due to small sample sizes. For students who take PreACT 8/9 in Grade 7 or earlier, the Fall Grade 8 norms are used to assign the US ranks. For students who take PreACT 8/9 in the spring of Grade 9 or later, the Spring Grade 9 norms are used to assign the US ranks.

Table 2. Number of Students by Grade Level and Season

Season	Grade level			
	7	8	9	Other
Fall	3,088	83,844	173,363	2,827
Spring	4,792	60,604	149,594	1,976

Weighting Methodology

Weighting was used to ensure similarity in student- and school-level demographic variables across samples. The samples were weighted to a common population, which we refer to as the ACT population. The ACT population includes students who took the ACT test and completed high school in the spring of 2022. Because the PreACT 8/9 samples were weighted to the demographic profile of the ACT population, differences in norms across grade levels and seasons are more likely to reflect true differences in academic development instead of underlying differences in schools and demographics across samples. The PreACT 8/9 test is used to simulate the ACT testing experience and provide students with practice and preparation for the ACT test. This intended use also supports using the ACT population as the target population for the development of the PreACT 8/9 norms. The weighting variables were gender, race/ethnicity, school geographic region, and school category. School category is defined by public/nonpublic status and by the percentage of students eligible for the free and reduced-price lunch (FRL) program.

For each combination of the weighting variables (e.g., Grade 8 female African American students who attend nonpublic schools in the Midwest), 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 (i.e., $weight = \frac{ACT\ percentage}{PreACT\ 8/9\ precentage}$ for each combination within each norm sample). In the cases where weights were very large (greater than 5) or very small (less than 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 four norm samples (Fall Grade 8, Spring Grade 8, Fall Grade 9, and Spring Grade 9). For Grade 8 and Grade 9, Table 3 and Table 4 (respectively) show the distributions of the ACT population and the weighted and unweighted PreACT 8/9 samples in terms of weighting variables. To compute weighted frequency tables, we used the wtd.table function in the R package questionr (Barnier et al., 2023).

Table 3. Summary of the ACT Population and the Grade 8 PreACT 8/9 Samples

| | | | PreACT 8/9 | | | |
| | | | Fall | | Spring | |
Weighting variable		ACT population (%)	Unweighted (%)	Weighted (%)	Unweighted (%)	Weighted (%)
Gender	Female	49.96	44.00	49.54	46.72	49.39
	Male	46.78	46.68	46.68	48.19	47.03
	Missing/Another Gender/Prefer Not to Respond	3.26	9.33	3.78	5.09	3.58
Race/ethnicity	African American	11.38	10.04	11.51	11.57	12.25
	Asian	4.04	3.21	3.64	3.79	2.70
	Caucasian	52.53	50.52	52.84	51.05	53.94
	Hispanic	15.57	8.49	14.94	7.03	13.54
	Other	5.78	13.40	6.13	15.82	6.49
	Unknown	10.70	14.33	10.94	10.75	11.08
Region	Midwest	29.11	16.68	28.30	14.53	27.85
	Northeast	4.23	0.29	0.98	0.91	1.29
	South	51.89	70.89	56.70	70.16	61.76
	West	14.77	12.06	14.02	7.50	9.09
School category	Nonpublic	10.92	15.23	11.57	55.86	15.64
	Public, 0%–10% FRL [a]	5.97	2.60	4.30	0.58	2.09
	Public, 10%–20% FRL	11.26	7.05	11.42	3.12	9.60
	Public, 20%–40% FRL	25.50	21.98	27.12	8.29	25.61
	Public, 40%–60% FRL	19.65	21.37	21.16	8.84	20.26
	Public, 60%–80% FRL	8.28	13.03	8.74	8.17	8.89
	Public, >80% FRL	9.49	12.40	9.45	8.79	9.94
	Public, FRL unknown	8.93	6.33	6.24	6.35	7.97
	Public total	89.08	84.77	88.43	44.14	84.36

[a] FRL = free and reduced-price lunch

Table 4. Summary of the ACT Population and the Grade 9 PreACT 8/9 Samples

Weighting variable		ACT population (%)	PreACT 8/9			
			Fall		Spring	
			Unweighted (%)	Weighted (%)	Unweighted (%)	Weighted (%)
Gender	Female	49.96	45.25	49.52	45.95	49.51
	Male	46.78	48.48	47.02	48.59	46.99
	Missing/Another Gender/Prefer Not to Respond	3.26	6.28	3.45	5.46	3.49
Race/ethnicity	African American	11.38	10.59	11.68	15.33	11.84
	Asian	4.04	2.80	3.22	2.68	3.20
	Caucasian	52.53	54.18	55.03	53.07	52.96
	Hispanic	15.57	8.51	13.87	7.58	14.95
	Other	5.78	13.80	6.31	11.91	6.35
	Unknown	10.70	10.11	9.90	9.43	10.70
Region	Midwest	29.11	61.39	32.18	34.12	30.19
	Northeast	4.23	1.50	2.82	0.68	1.84
	South	51.89	33.44	56.35	56.57	56.20
	West	14.77	3.65	8.66	8.54	11.78
School category	Nonpublic	10.92	16.87	12.07	34.61	12.40
	Public, 0%–10% FRL [a]	5.97	5.85	5.91	3.25	4.04
	Public, 10%–20% FRL	11.26	7.05	10.35	8.96	11.29
	Public, 20%–40% FRL	25.50	28.71	26.35	21.06	27.43
	Public, 40%–60% FRL	19.65	20.05	20.04	13.91	20.67
	Public, 60%–80% FRL	8.28	10.47	9.30	8.55	8.45
	Public, >80% FRL	9.49	9.11	8.62	7.37	9.43
	Public, FRL unknown	8.93	1.90	7.37	2.29	6.29
	Public total	89.08	83.13	87.93	65.39	87.60

[a] FRL = free and reduced-price lunch

Estimation of Weighted Percentile Ranks and Summary Statistics

The weighted PreACT 8/9 norm samples were used to develop norms for each grade level and season. A five-degree polynomial log-linear smoothing was applied to the weighted empirical cumulative percentages. Tables 5–10 present the rounded cumulative percentages (i.e., norms) for each norming sample, showing the percentage of students who scored at or below each scale score point for the English, math, reading, science, STEM, and Composite scale scores, respectively.

Table 5. 2023 PreACT 8/9 English Norms: Percentages of Students at or Below Each Scale Score

PreACT 8/9 Scale Score	Grade Level and Season			
	8		9	
	Fall (%)	Spring (%)	Fall (%)	Spring (%)
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	2	2	1	1
6	4	4	3	3
7	8	7	6	6
8	14	12	11	11
9	21	19	18	17
10	29	26	25	23
11	37	34	32	30
12	45	41	39	37
13	53	49	46	44
14	60	56	53	51
15	66	63	60	57
16	72	69	66	63
17	77	75	72	69
18	82	80	77	74
19	86	84	81	79
20	89	87	85	83
21	92	90	89	87
22	94	93	92	90
23	96	95	94	92
24	97	96	95	94
25	98	97	97	96
26	98	98	97	97
27	99	99	98	98
28	99	99	99	98
29	99	99	99	99
30	100	100	100	100
N	83,844	60,604	173,363	149,594

Table 6. 2023 PreACT 8/9 Math Norms: Percentages of Students at or Below Each Scale Score

| PreACT 8/9 Scale Score | Grade Level and Season | | | |
| | 8 | | 9 | |
	Fall (%)	Spring (%)	Fall (%)	Spring (%)
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1
11	3	3	2	2
12	8	7	6	6
13	18	15	14	14
14	32	27	26	25
15	47	41	41	39
16	62	55	55	52
17	73	67	67	64
18	80	75	75	72
19	86	81	81	78
20	89	86	85	82
21	91	89	88	86
22	93	91	90	88
23	94	93	92	90
24	95	94	93	92
25	96	96	95	94
26	97	97	96	95
27	98	98	98	97
28	99	99	99	99
29	99	99	99	99
30	100	100	100	100
N	83,844	60,604	173,363	149,594

Table 7. 2023 PreACT 8/9 Reading Norms: Percentages of Students at or Below Each Scale Score

| PreACT 8/9 Scale Score | Grade Level and Season | | | |
| | **8** | | **9** | |
	Fall (%)	Spring (%)	Fall (%)	Spring (%)
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	2	2	1	2
7	3	3	2	3
8	5	4	4	4
9	7	7	6	6
10	11	10	9	9
11	15	13	12	12
12	20	18	17	17
13	27	24	23	22
14	33	30	29	28
15	40	37	36	34
16	48	44	42	40
17	54	51	49	46
18	61	57	56	53
19	66	63	61	58
20	71	68	67	63
21	75	73	71	68
22	79	77	75	72
23	82	80	79	76
24	85	84	82	80
25	88	87	85	83
26	90	89	88	86
27	93	92	91	89
28	95	95	93	92
29	97	97	96	96
30	100	100	100	100
N	83,844	60,604	173,363	149,594

Table 8. 2023 PreACT 8/9 Science Norms: Percentages of Students at or Below Each Scale Score

PreACT 8/9 Scale Score	Grade Level and Season			
	8		9	
	Fall (%)	Spring (%)	Fall (%)	Spring (%)
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	3	3	3	3
10	7	6	6	5
11	12	11	10	10
12	20	18	16	16
13	29	26	24	24
14	39	36	33	32
15	49	46	43	41
16	59	56	52	50
17	68	65	61	59
18	75	72	69	67
19	81	79	76	73
20	85	84	81	79
21	89	88	86	84
22	92	91	89	88
23	94	93	92	91
24	96	95	94	93
25	97	97	96	95
26	98	98	97	96
27	99	98	98	97
28	99	99	99	98
29	99	99	99	99
30	100	100	100	100
N	83,844	60,604	173,363	149,594

Table 9. 2023 PreACT 8/9 STEM Norms: Percentages of Students at or Below Each Scale Score
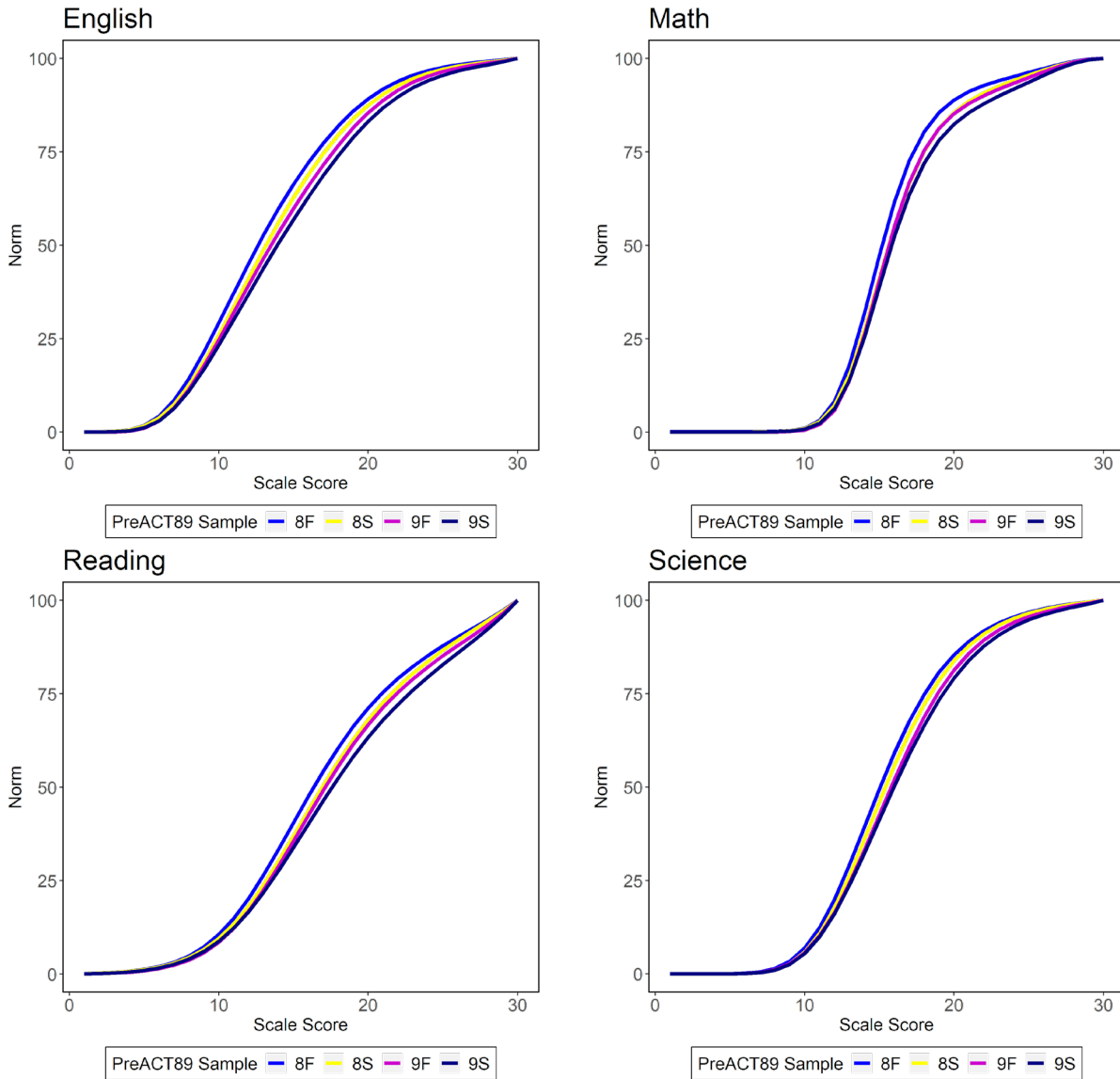
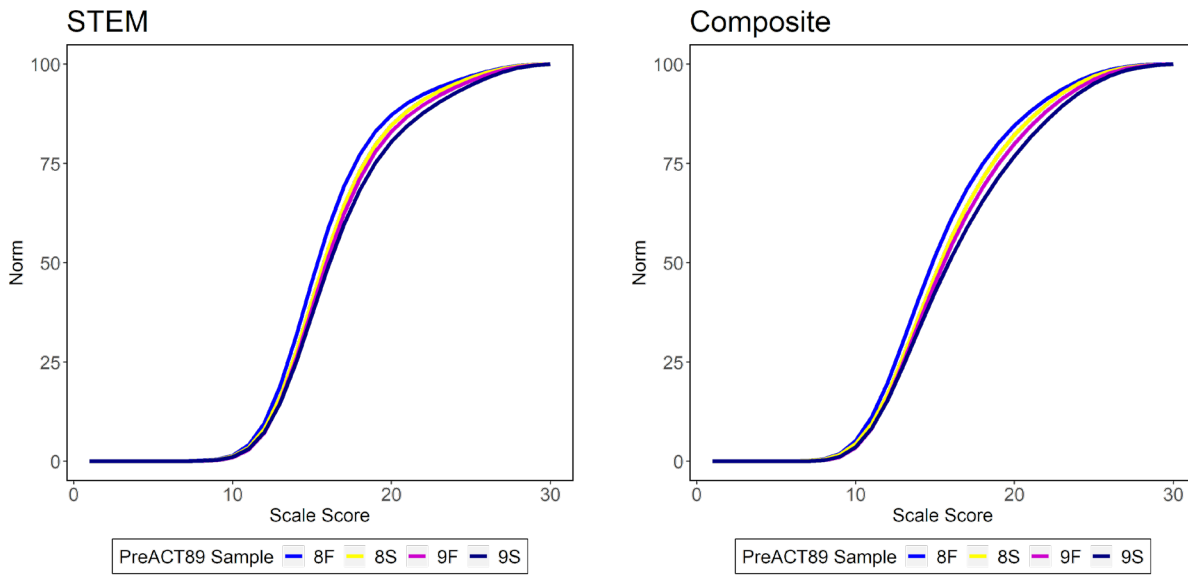| PreACT 8/9 Scale Score | Grade Level and Season | | | |
| | 8 | | 9 | |
	Fall (%)	Spring (%)	Fall (%)	Spring (%)
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	1	1	1	1
10	1	1	1	1
11	4	3	3	3
12	10	8	7	7
13	19	16	15	15
14	32	27	26	25
15	45	40	38	37
16	58	53	51	49
17	69	64	62	60
18	77	73	71	68
19	83	80	78	75
20	87	85	83	80
21	90	88	87	85
22	92	91	90	88
23	94	93	92	90
24	96	95	94	93
25	97	97	96	95
26	98	98	97	97
27	99	99	99	98
28	99	99	99	99
29	99	99	99	99
30	100	100	100	100
N	83,844	60,604	173,363	149,594

Table 10. 2023 PreACT 8/9 Composite Norms: Percentages of Students at or Below Each Scale Score

PreACT 8/9 Scale Score	Grade Level and Season			
	8		9	
	Fall (%)	Spring (%)	Fall (%)	Spring (%)
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	1	1
6	1	1	1	1
7	1	1	1	1
8	1	1	1	1
9	2	2	1	1
10	5	4	3	4
11	11	9	8	8
12	20	17	15	15
13	30	26	25	24
14	41	37	35	33
15	52	47	45	43
16	61	56	54	51
17	69	64	62	59
18	75	71	69	66
19	80	77	75	72
20	85	82	80	77
21	88	86	84	82
22	91	90	88	86
23	94	93	91	89
24	96	95	94	93
25	97	97	96	95
26	99	98	98	97
27	99	99	99	98
28	99	99	99	99
29	99	99	99	99
30	100	100	100	100
N	83,844	60,604	173,363	149,594

Figure 2 shows the comparison of norms across grade levels and seasons. For each scale score point, the cumulative percentage decreases with grade level and season, reflecting increases in academic achievement from fall of eighth grade to spring of ninth grade.

Figure 2. 2023 PreACT 8/9 Norms (Cumulative Percentages) Across Grades and Seasons

The weighted mean and standard deviation (*SD*) for each subject, grade level, and season are shown in Table 11. The scale score statistics were calculated based on the estimated norms for each PreACT 8/9 norm sample.

Table 11. 2023 PreACT 8/9 Norms: Scale Score Means and Standard Deviations

Grade	Season	*N*	Statistic	English	Math	Reading	Science	STEM	Composite
8	Fall	83,844	Mean	13.8	16.4	17.5	16.1	16.5	16.1
			SD	5.1	3.6	5.9	4.3	3.6	4.1
	Spring	60,604	Mean	14.3	16.8	17.9	16.4	16.9	16.5
			SD	5.2	3.8	5.9	4.3	3.7	4.2
9	Fall	173,363	Mean	14.6	16.9	18.2	16.8	17.1	16.8
			SD	5.3	3.8	6.0	4.4	3.8	4.3
	Spring	149,594	Mean	15.0	17.2	18.6	17.0	17.4	17.1
			SD	5.5	4.1	6.2	4.6	4.0	4.5

To facilitate score interpretation and use, PreACT 8/9 scores are classified into one of three readiness levels:

1. **On Target**—Students scoring in this range are predicted to meet or exceed the ACT College Readiness Benchmark in Grade 11 or Grade 12. The PreACT 8/9 Readiness Benchmark is the score associated with a 50% chance of meeting the ACT College Readiness Benchmark in Grade 11 or Grade 12 and is the minimum score of the On Target range.
2. **Close to Target**—Students scoring in this range have less than a 50% chance, but greater than a 25% chance, of meeting the ACT College Readiness Benchmark.

Table 12 provides the percentage of students in each PreACT 8/9 readiness level for each grade, season, and subject (English, math, reading, science, and STEM) based on the estimated norms shown in Tables 5–10. The PreACT 8/9 readiness levels are used to monitor students' progress toward college readiness through their connection to the ACT College Readiness Benchmarks, as shown in Table 13.

Table 12. 2023 PreACT 8/9 Norms: Percentages of Students for PreACT 8/9 Readiness Levels

Subject	PreACT 8/9 Readiness Level	Grade 8		Grade 9	
		Fall (%)	Spring (%)	Fall (%)	Spring (%)
English	In Need of Intervention	8	7	11	17
	Close to Target	21	19	21	20
	On Target	71	74	68	63
Math	In Need of Intervention	8	15	26	39
	Close to Target	23	26	29	25
	On Target	68	59	45	36
Reading	In Need of Intervention	15	18	23	28
	Close to Target	18	19	20	19
	On Target	67	63	58	54
Science	In Need of Intervention	29	36	43	41
	Close to Target	30	29	18	25
	On Target	41	35	39	33
STEM	In Need of Intervention	58	64	71	75
	Close to Target	19	15	12	9
	On Target	23	20	17	15

Table 13. ACT College Readiness Benchmarks and the Scale Score Ranges for PreACT 8/9 Readiness Levels

Subject	ACT Benchmark	Grade Level and Season	PreACT 8/9 Readiness Level		
			In Need of Intervention	Close to Target	On Target
English	18	8, Fall	1–7	8–10	11–30
		8, Spring	1–7	8–10	11–30
		9, Fall	1–8	9–11	12–30
		9, Spring	1–9	10–12	13–30
Math	22	8, Fall	1–12	13–14	15–30
		8, Spring	1–13	14–15	16–30
		9, Fall	1–14	15–16	17–30
		9, Spring	1–15	16–17	18–30
Reading	22	8, Fall	1–11	12–14	15–30
		8, Spring	1–12	13–15	16–30
		9, Fall	1–13	14–16	17–30
		9, Spring	1–14	15–17	18–30
Science	23	8, Fall	1–13	14–16	17–30
		8, Spring	1–14	15–17	18–30
		9, Fall	1–15	16–17	18–30
		9, Spring	1–15	16–18	19–30
STEM	26	8, Fall	1–16	17–18	19–30
		8, Spring	1–17	18–19	20–30
		9, Fall	1–18	19–20	21–30
		9, Spring	1–19	20–21	22–30

References

Barnier, J., Briatte, F., & Larmarange, J. (2023). *questionr: Functions to make surveys processing easier* (R package Version 0.7.8). https://CRAN.R-project.org/package=questionr

Notes

[1] Unlike the ACT test, the PreACT 8/9 test does not include an English language arts (ELA) score because there is no separate writing test.

ABOUT ACT

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