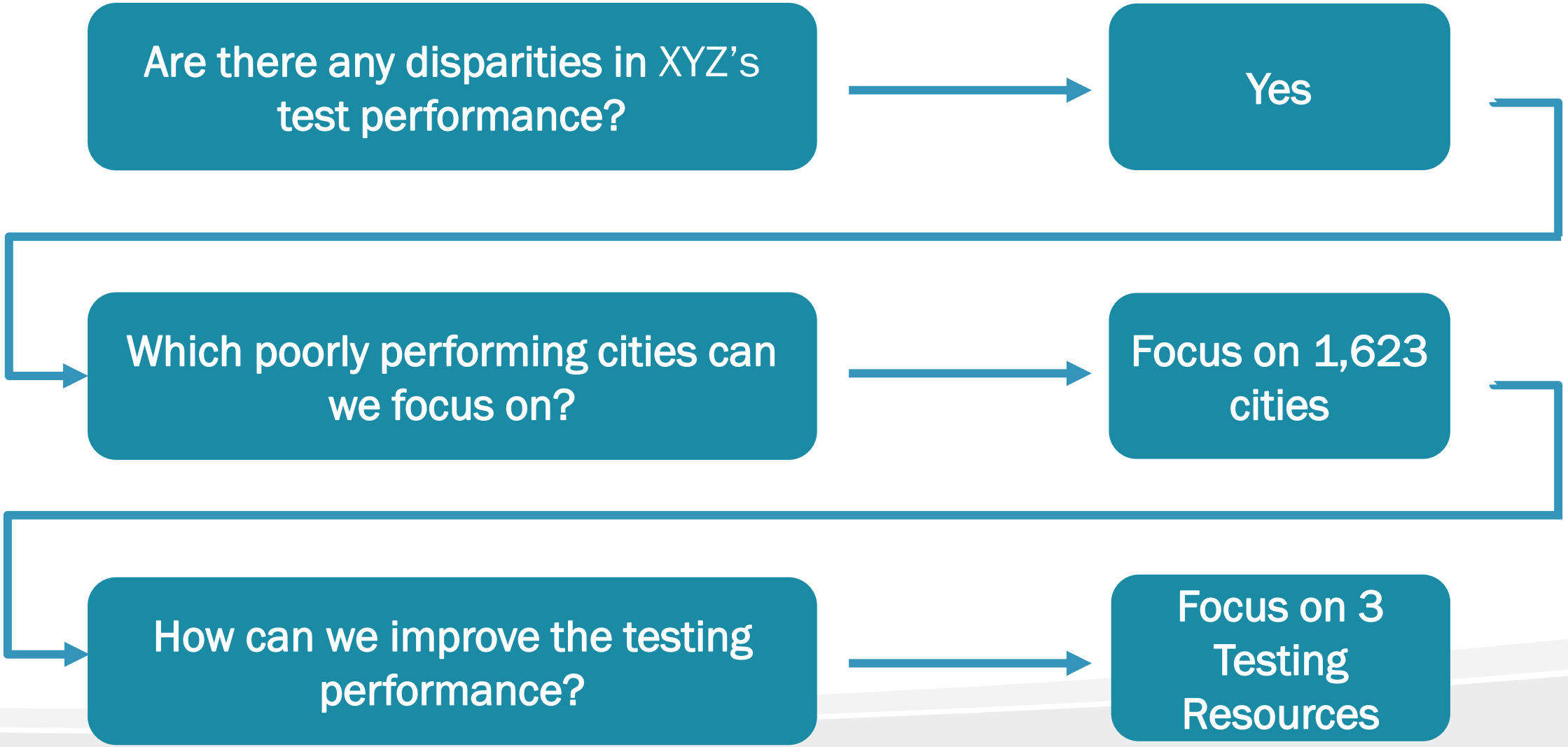
ROOT CAUSE ANALYSIS for a Testing Service Provider

Helping adults gain their High School Diploma

Answering the Business Problem

Can we identify patterns of testing performance disparity in the XYZ test that correlate to regional available testing resources and sites, and identify potential drivers of those disparities?

Breakdown of the Problem Statement



Solution Overview

Are there any disparities in XYZ's test performance?

Used KPIs to perform exploratory analysis

SQL
Python

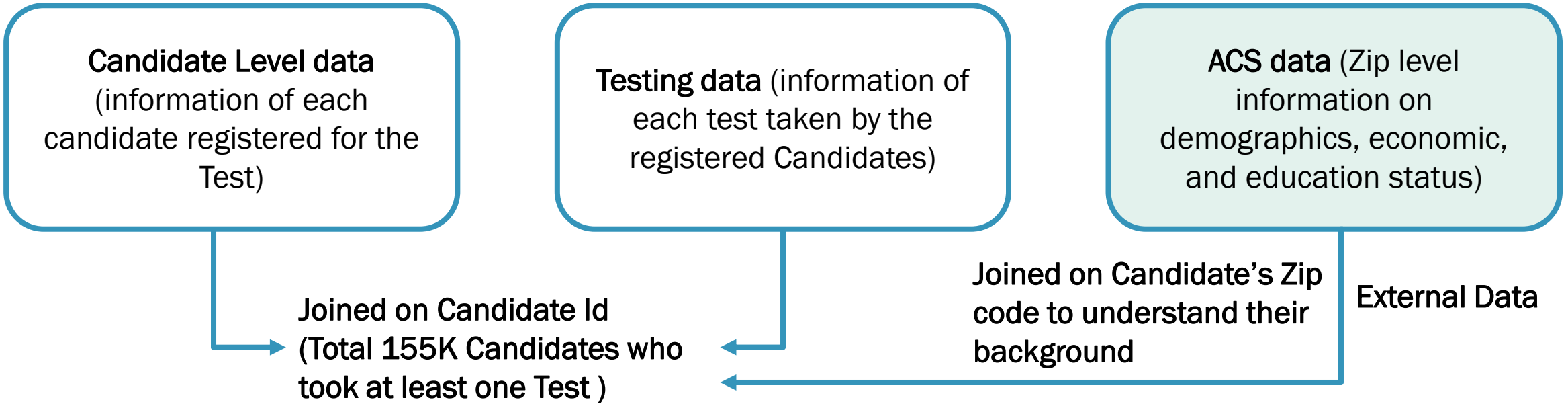
Solution Overview

Are there any disparities in XYZ's test performance?	→	Used KPIs to perform exploratory analysis	SQL Python
Which poorly performing cities can we focus on?	→	Performed City level segmentation and matching	Python R

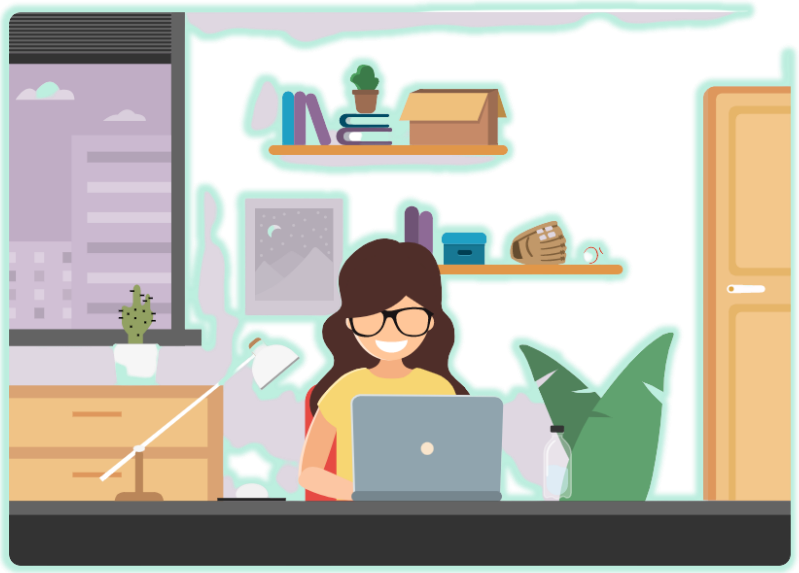
Solution Overview

Are there any disparities in XYZ's test performance?	→	Used KPIs to perform exploratory analysis — SQL, Python
Which poorly performing cities can we focus on?	→	Performed City level segmentation and matching — Python, R
How can we improve the testing performance?	→	Used Linear Regression to identify impact of different Study sources on Similar cities — Python

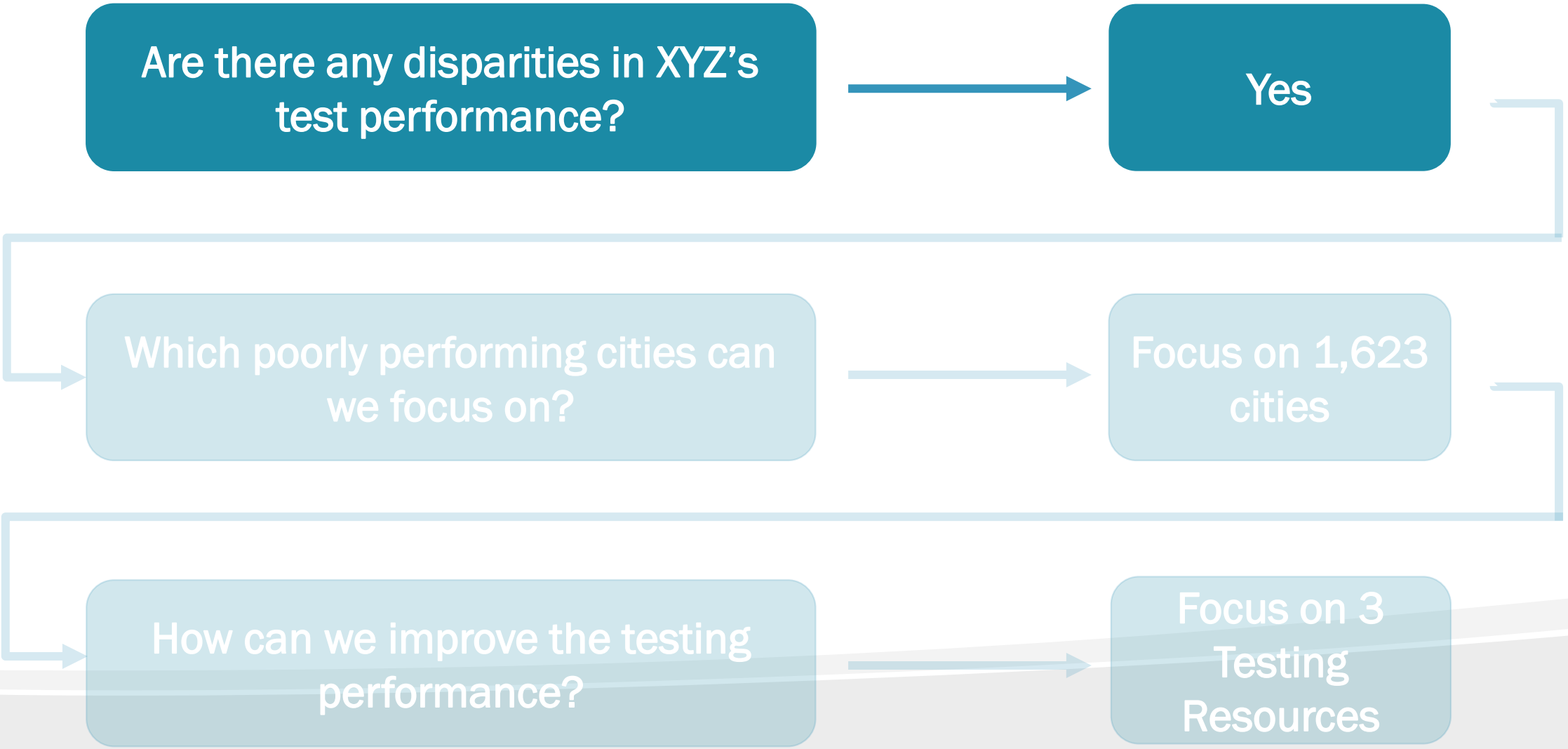
Data Overview



Detailed Analysis



Breakdown of the Problem Statement

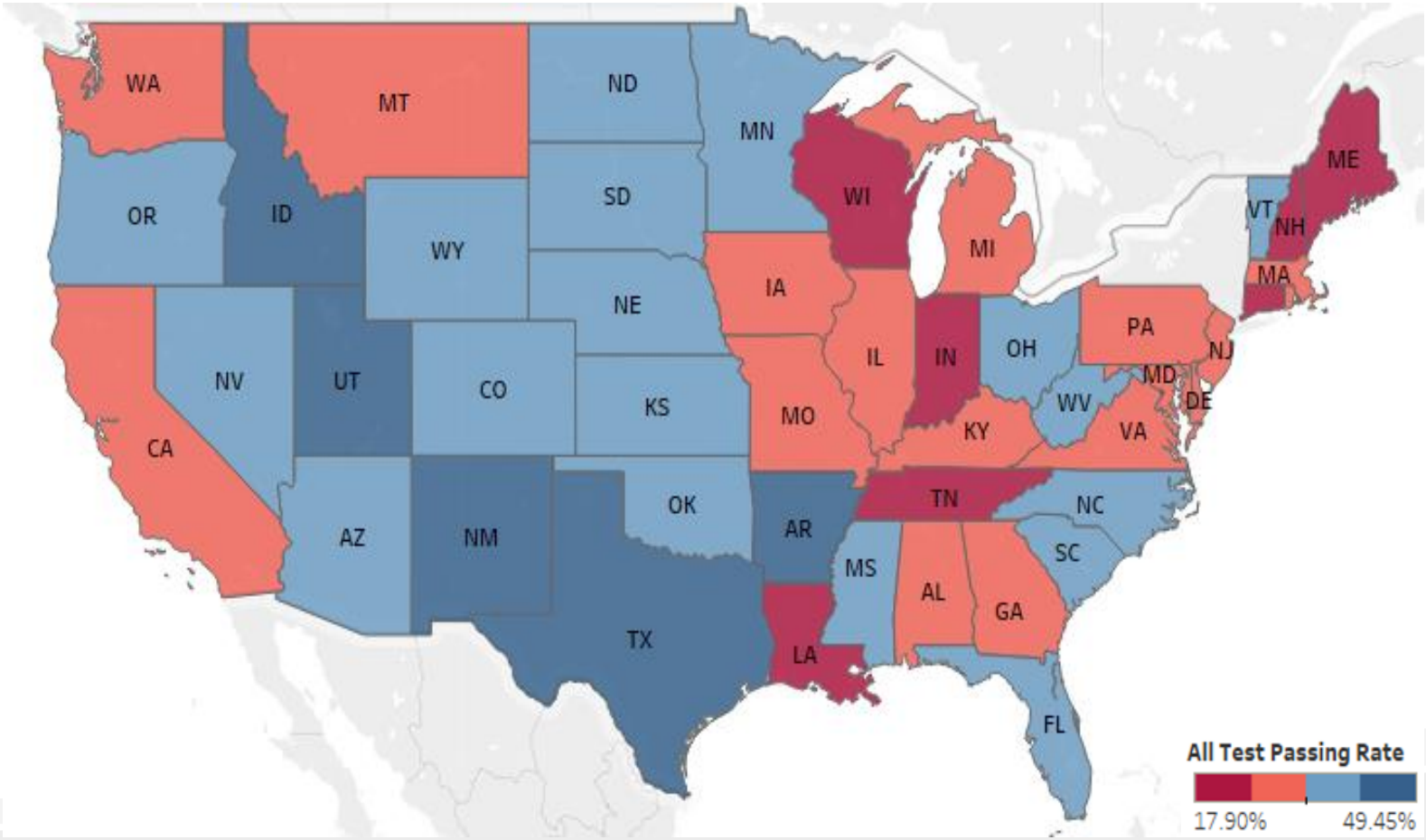


KPIs for XYZ Test Performance

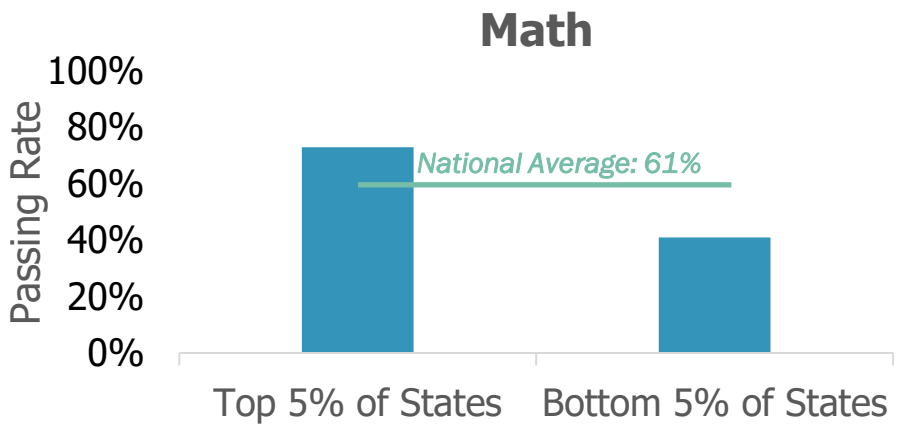
There's more to measure than passing rate of XYZ Test

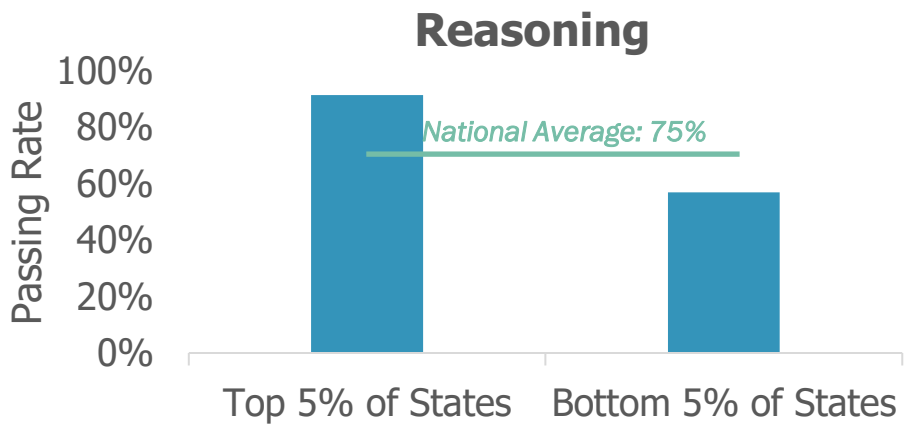
Metric
1. All Test Passing Rate
2. Subject-wise Passing Rate
3. Subject-wise Median Score
4. # Attempts taken to pass
5. # Months taken to pass

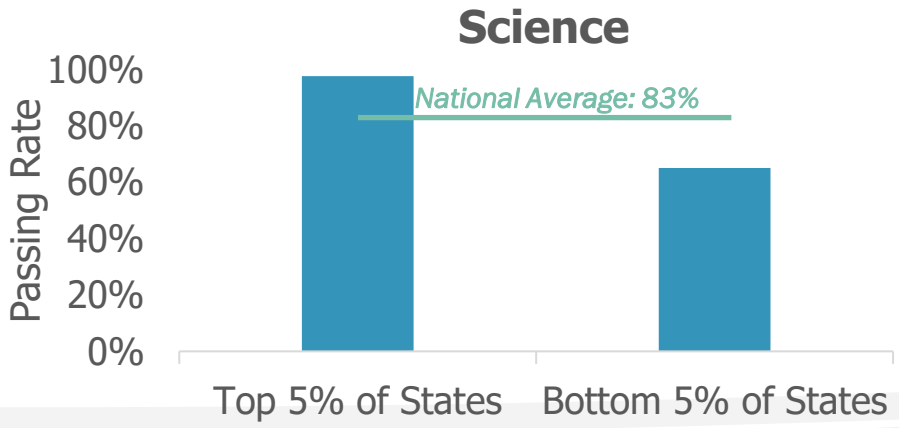
1st KPI: All Test Passing Rate

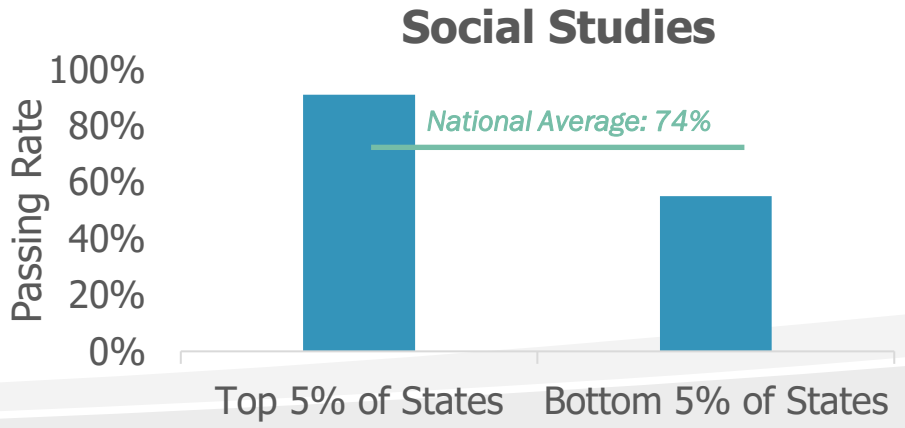


2nd KPI: Subject-Wise Passing Rate









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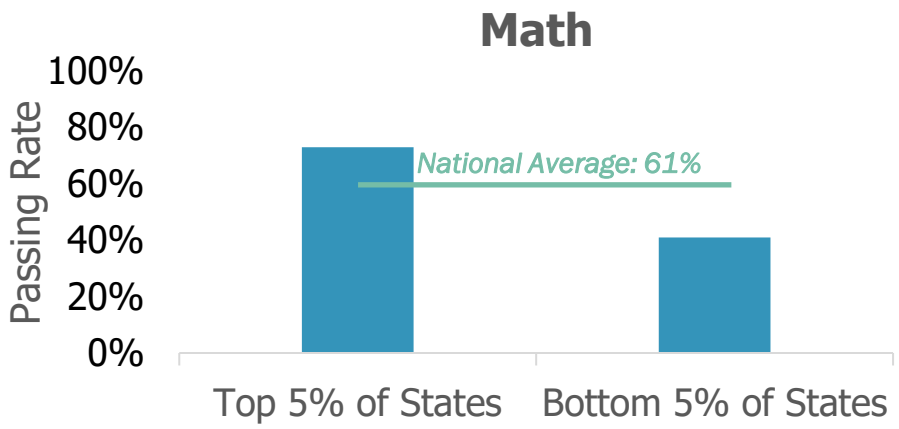

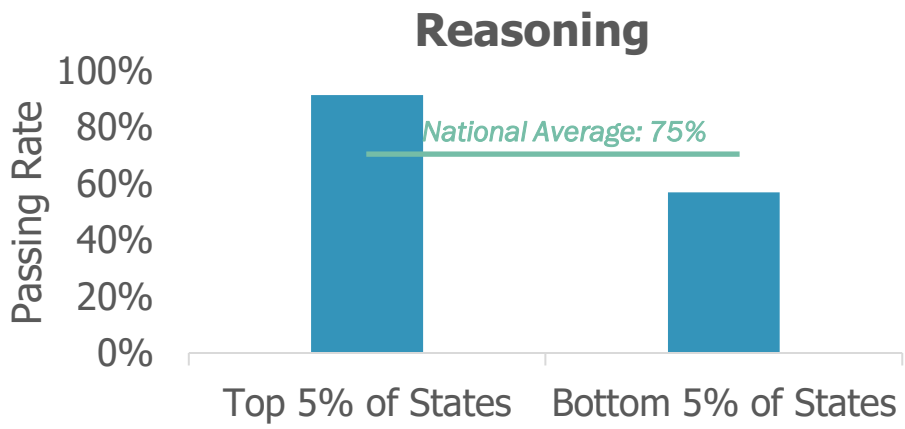

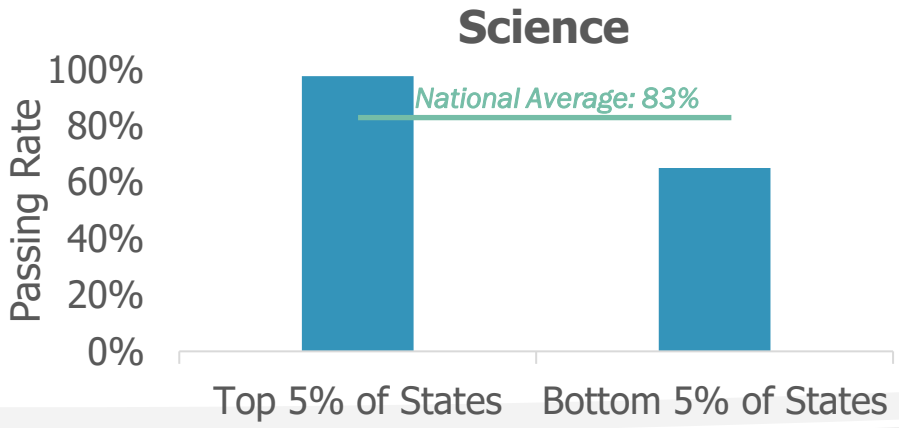

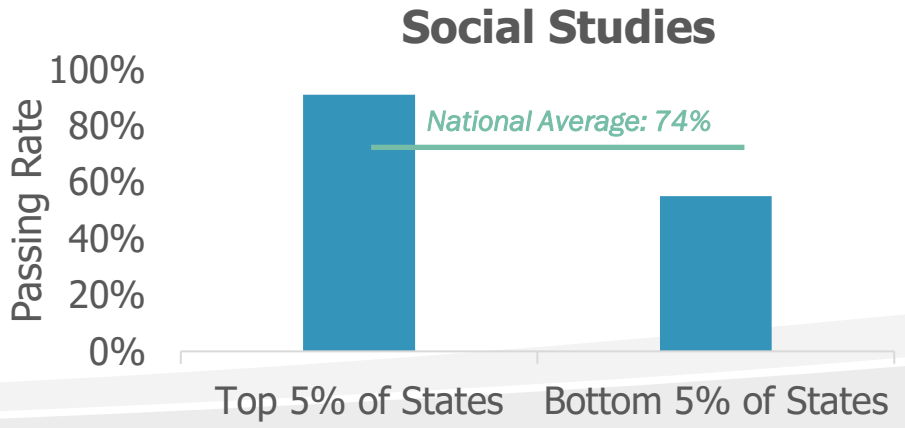

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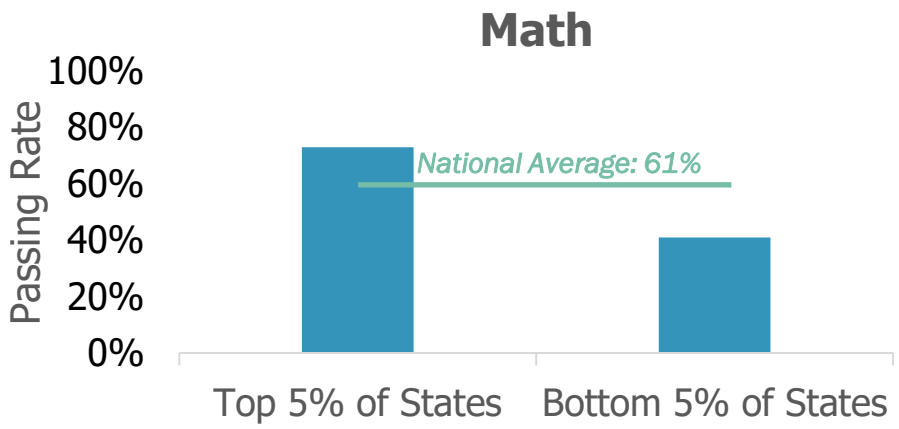
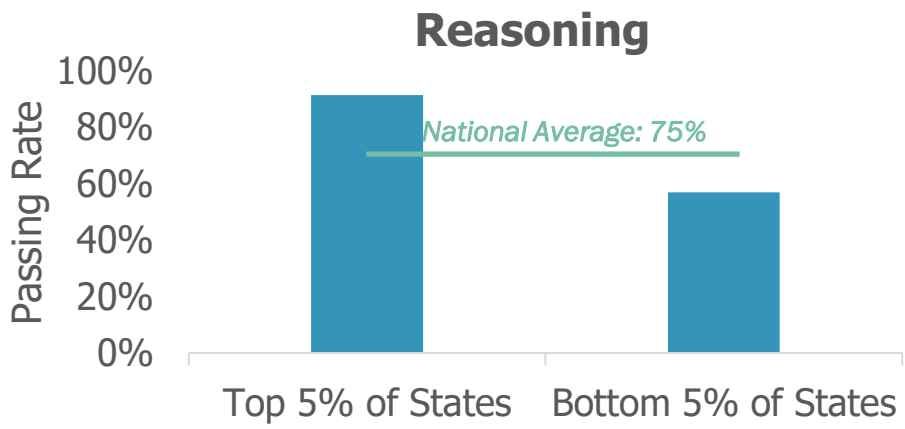
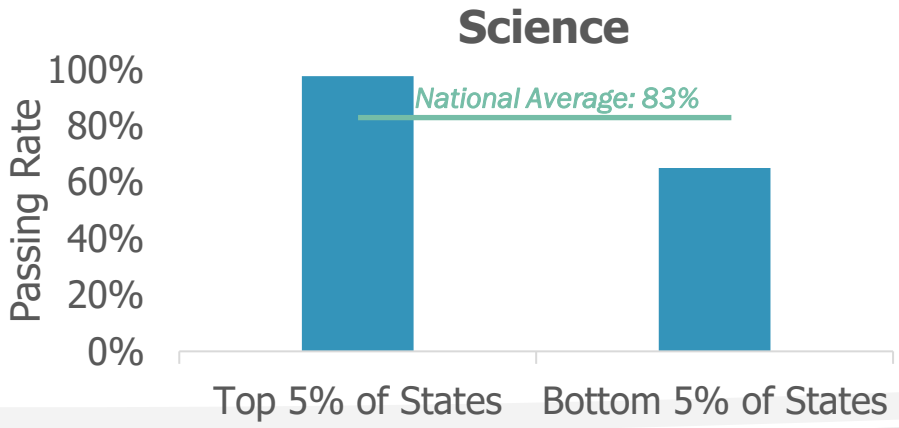
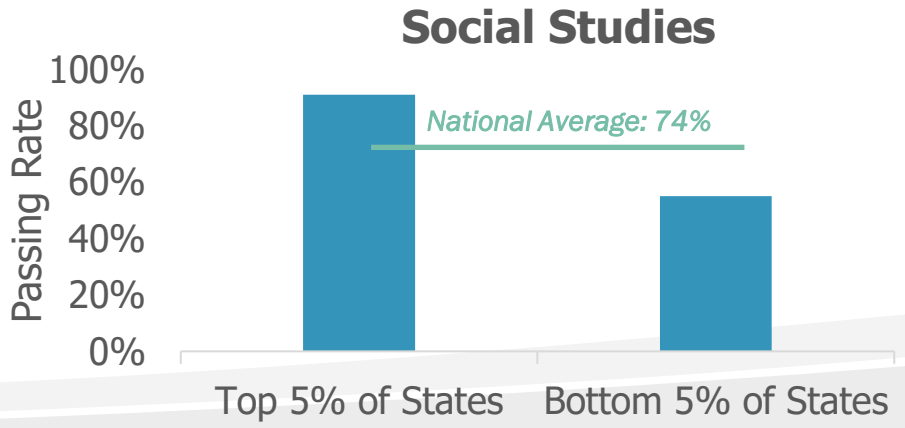
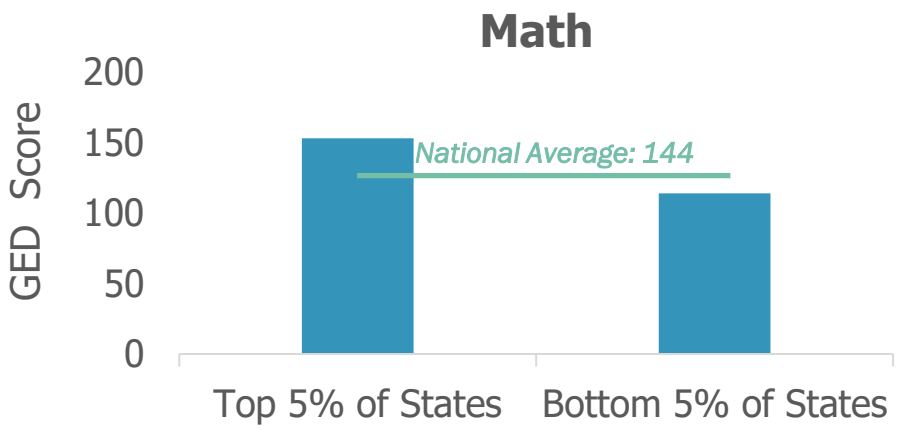


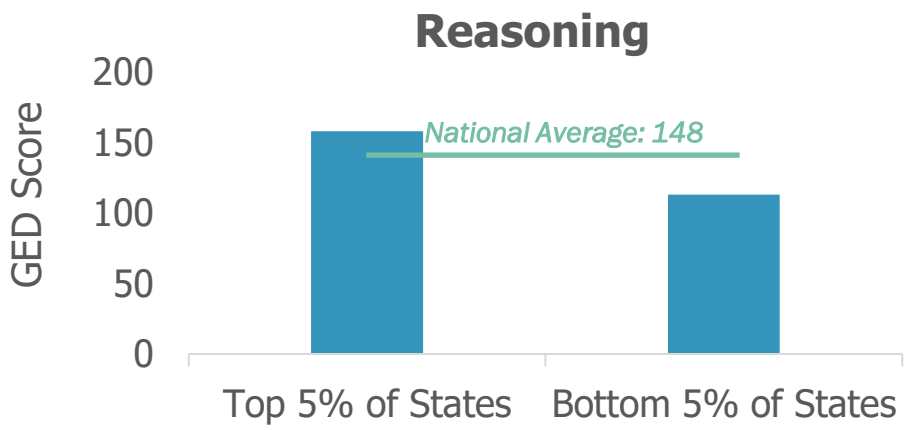


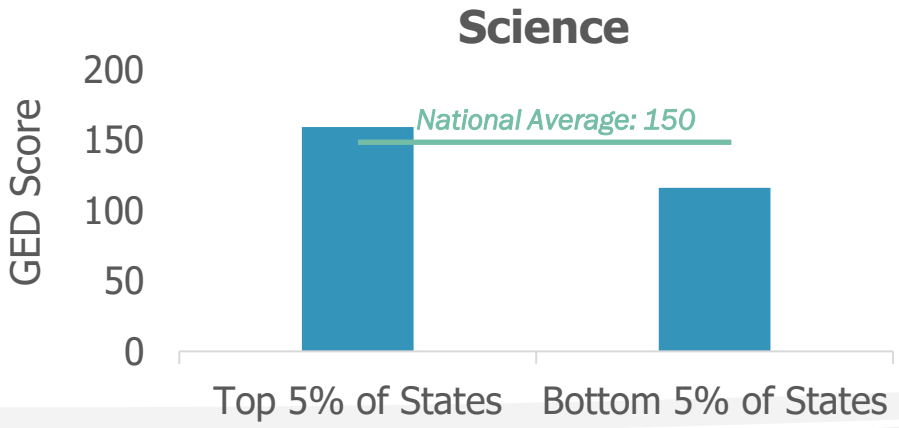


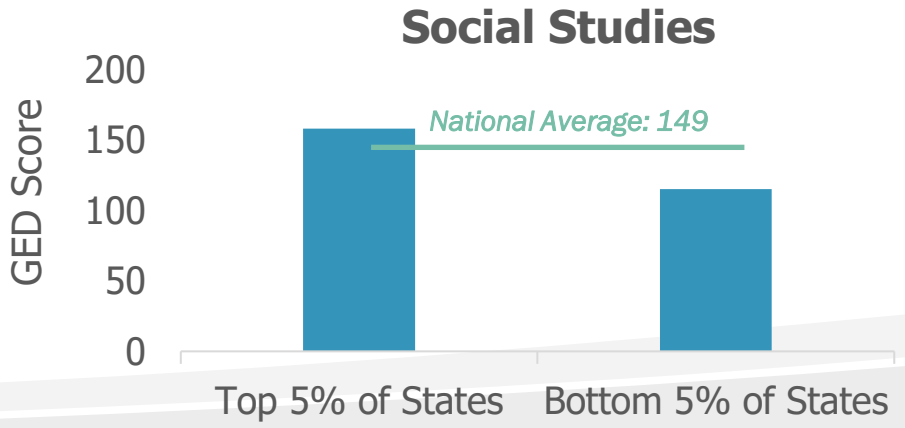


3rd KPI: Subject-Wise Median Score









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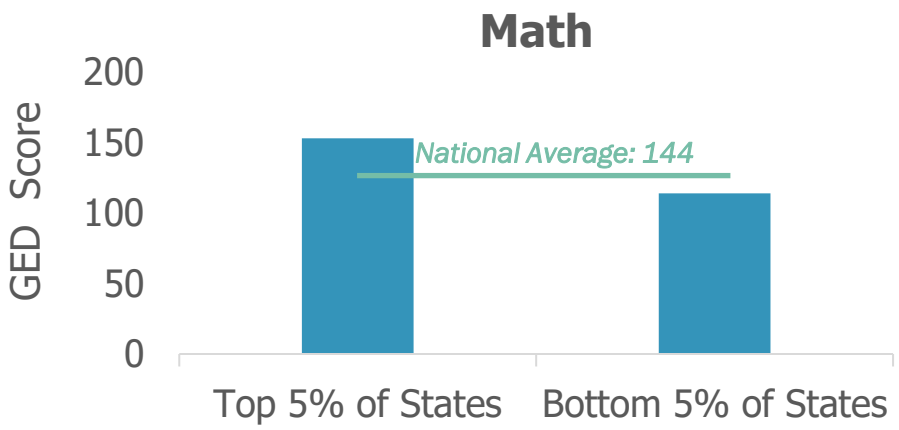

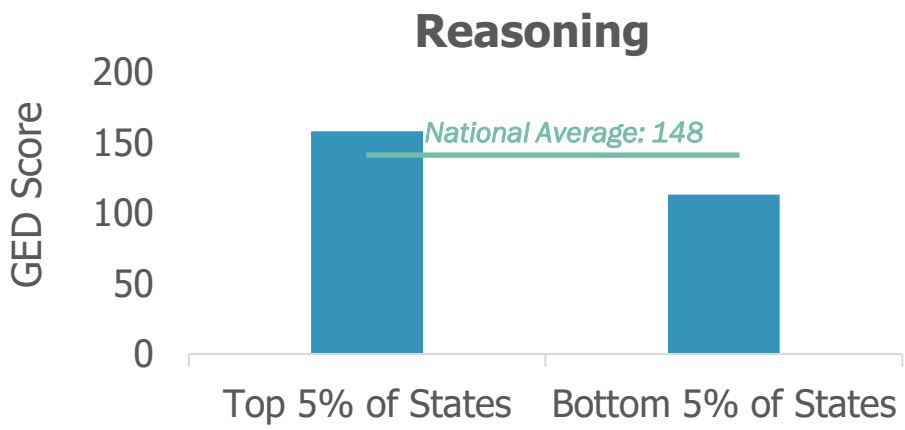

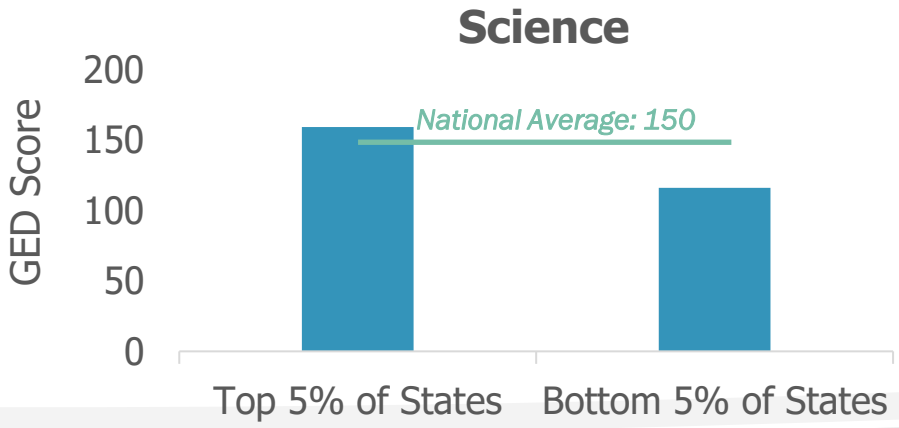

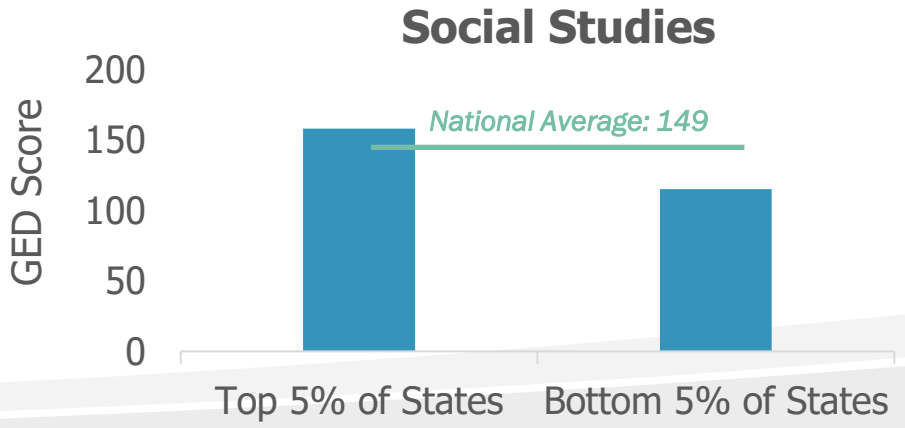

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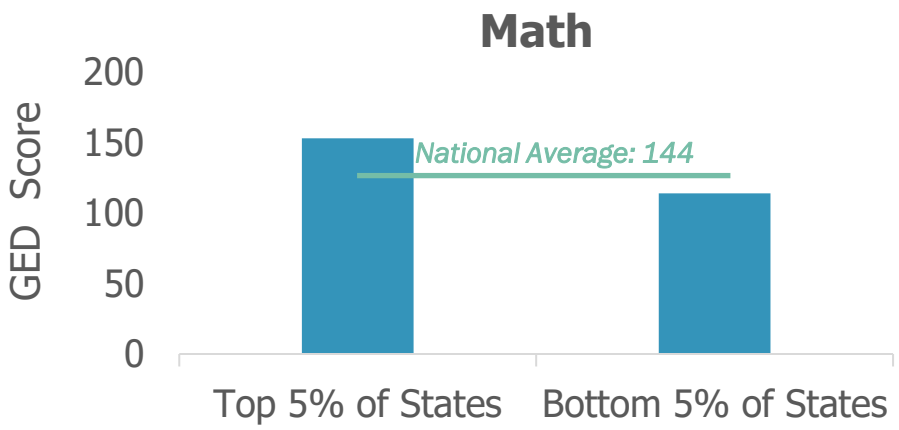

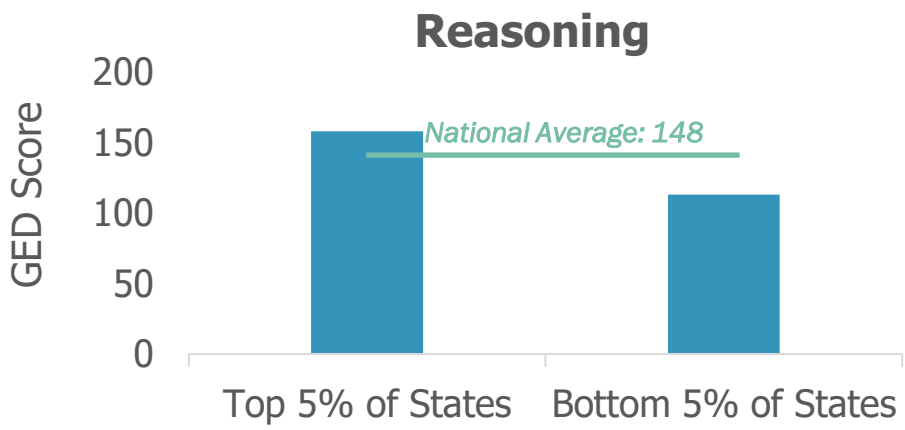

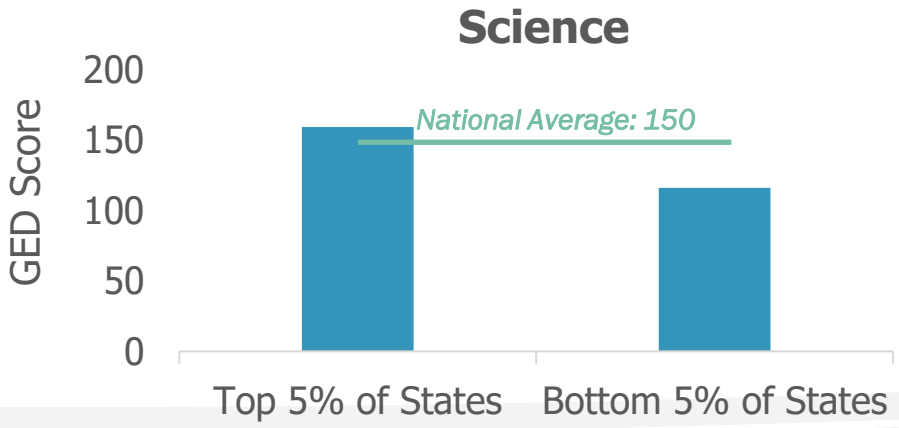

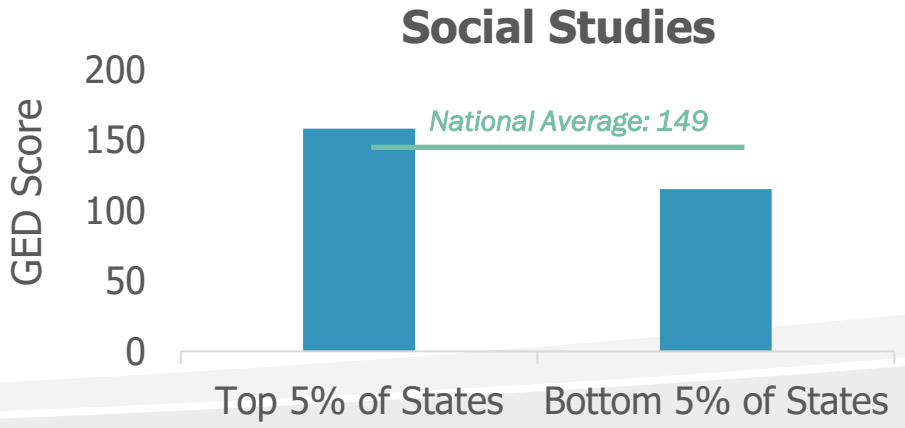

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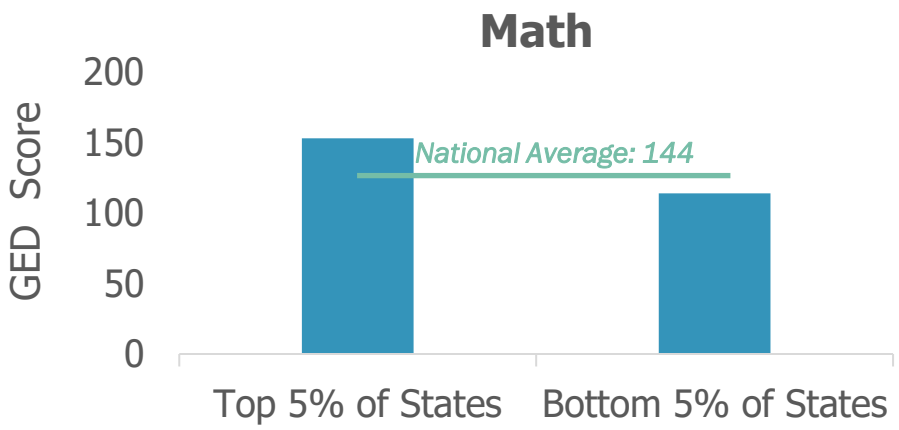
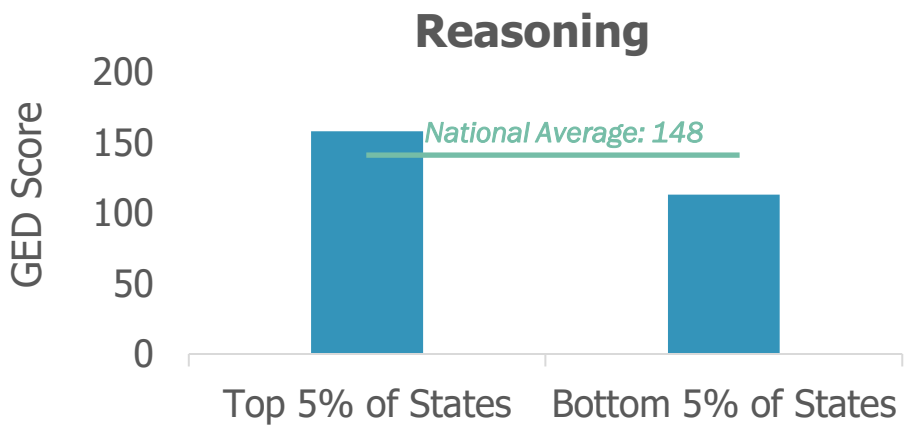
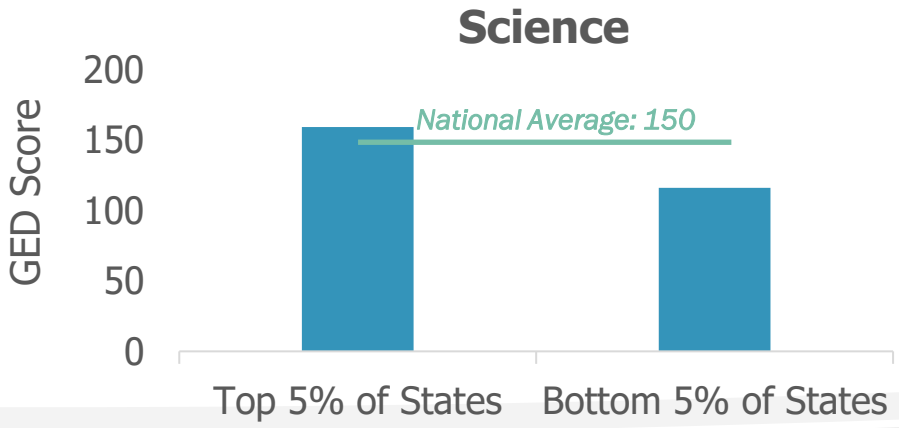
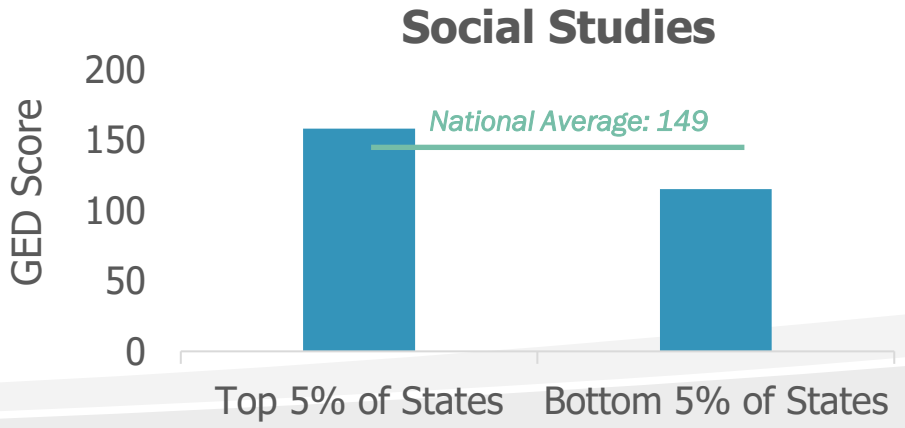


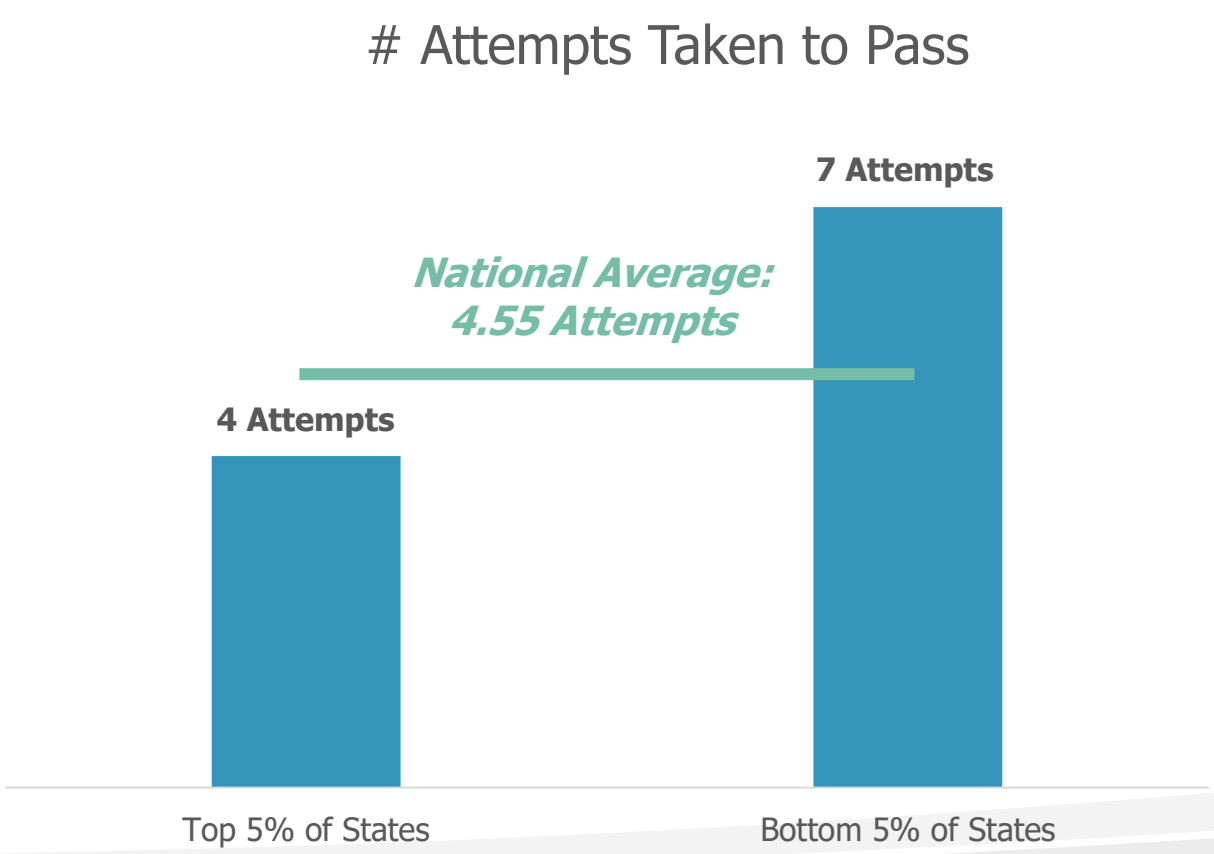






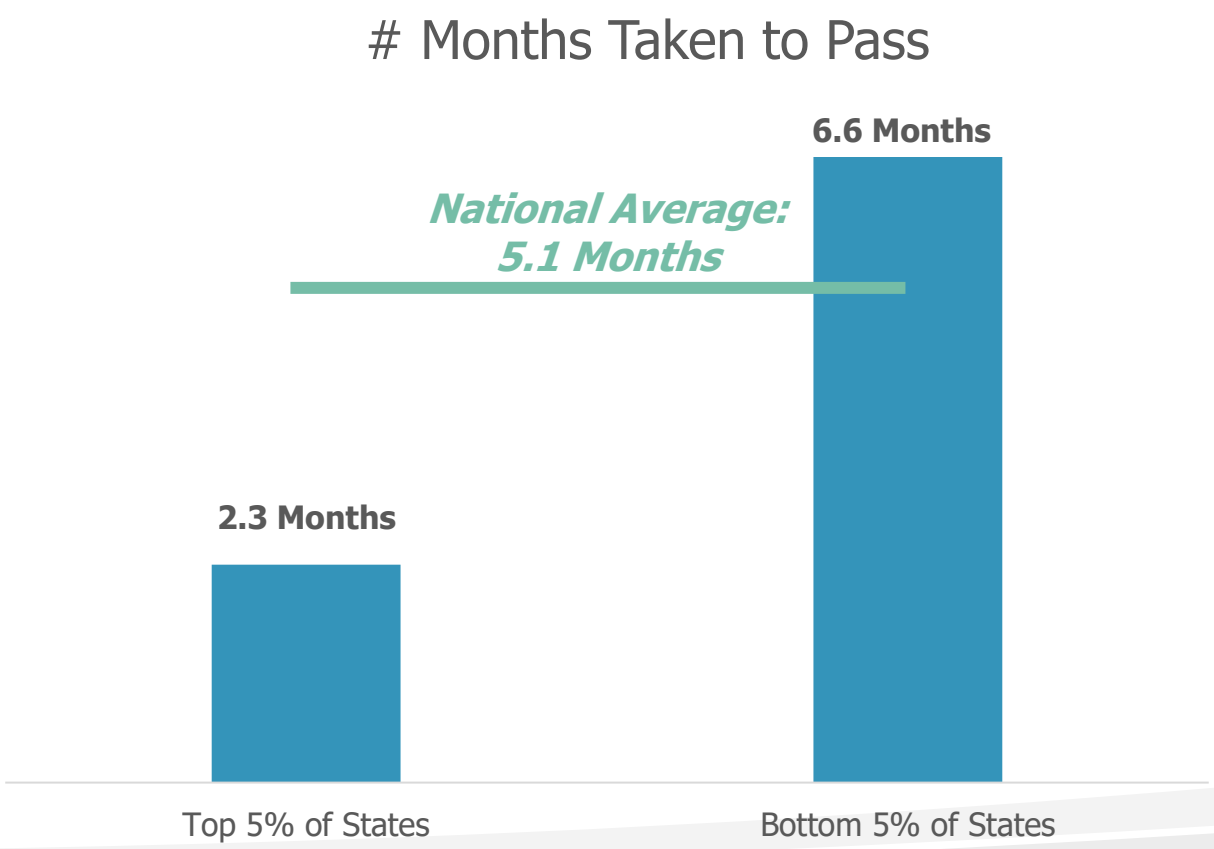
4th KPI: # Attempts Taken to Pass

Attempts Taken to Pass is number of XYZ tests taken until all tests passed

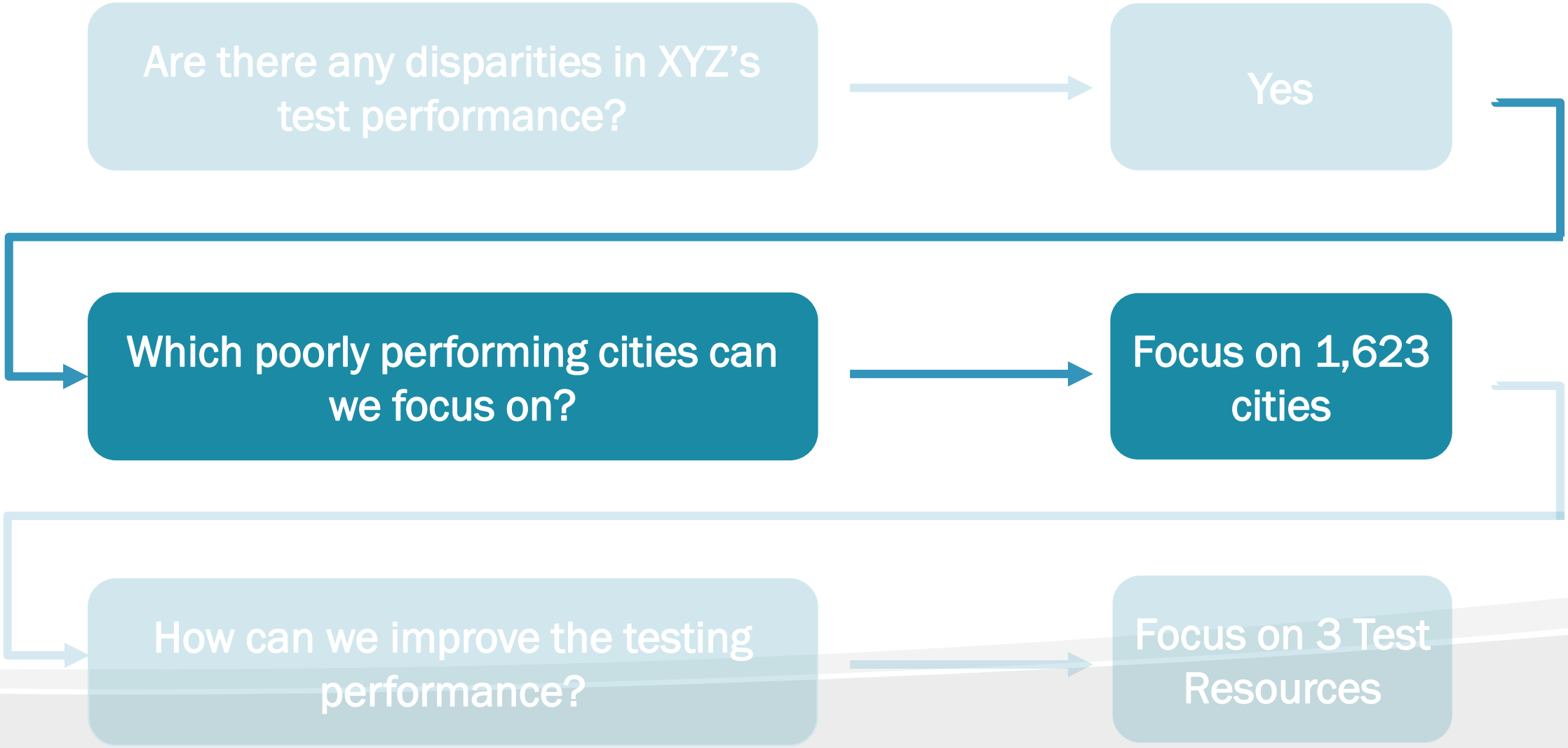


5th KPI: # Months Taken to Pass

Months Taken to Pass is time from account creation to all tests passed



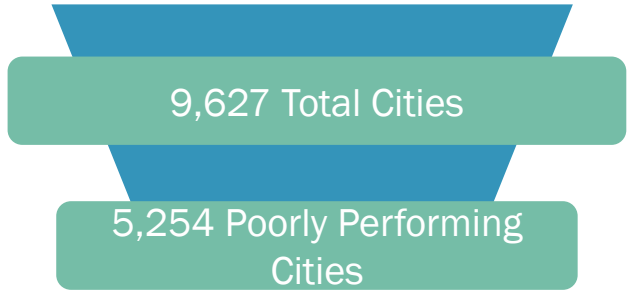
Breakdown of the Problem Statement



Identifying Poorly Performing Cities

	Cluster 1	Cluster 2
Number of Cities	4,373	5,254
All Test Passing Rate	66%	50%
Math Passing Rate	80%	63%
Math Median Score	152	142
# Attempts Taken to Pass	4.38	4.57
# Months taken to Pass	4.9 Months	5.5 Months

What we are focusing on



This cluster performs lower on all KPI metrics. This will be our focus.

Matching Poor Performing Cities on Demographics

Cluster 2

Duluth, MN **Johnson City, TN**

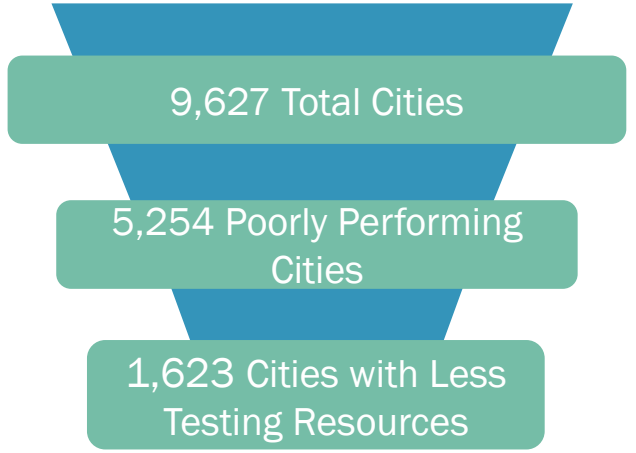
Similar

- Population Size
- Education less than High School
- Poverty population
- Racial Demographics
- Gender Demographics

Different

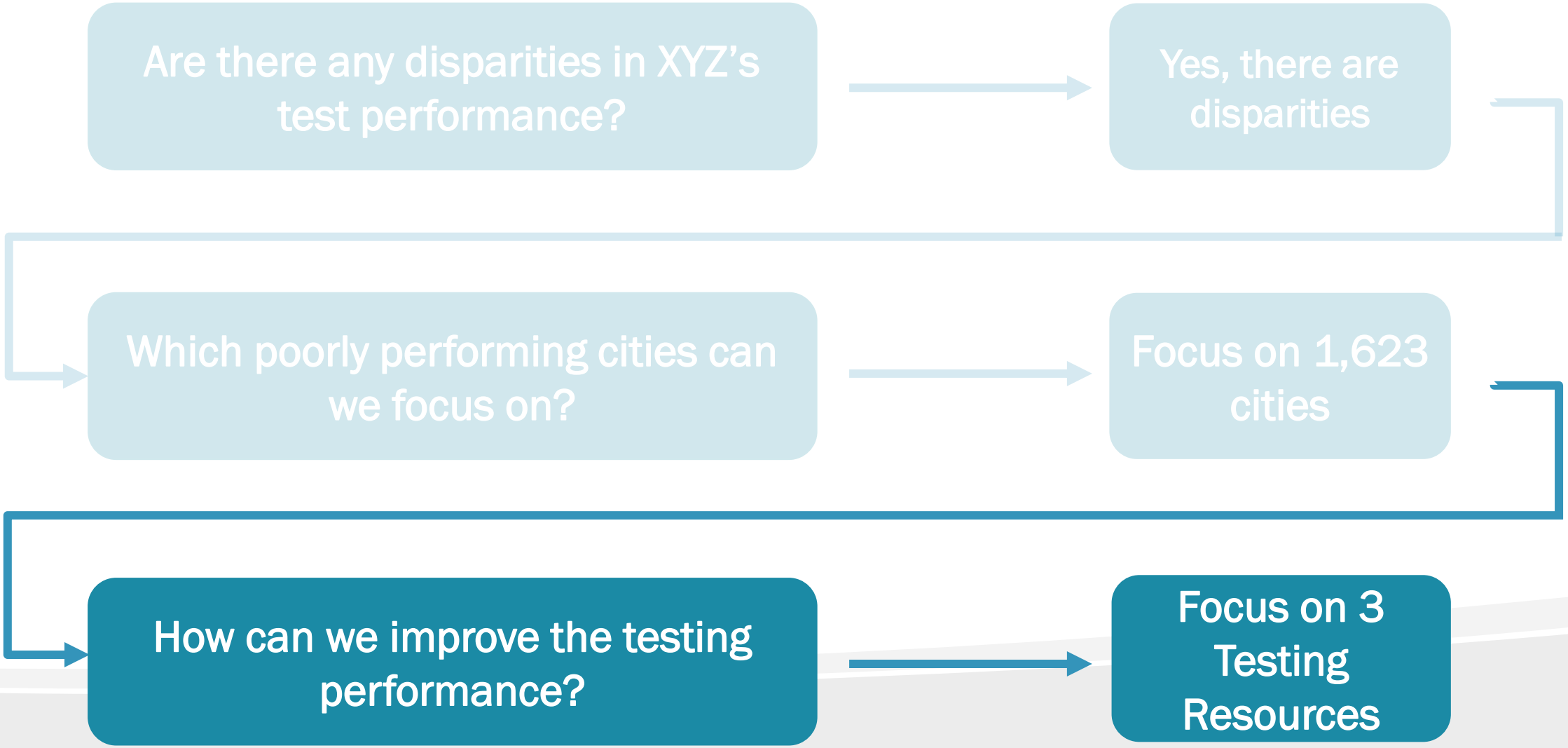
More Testing Resources	Less Testing Resources
	-Prep Course -Prep Tests

What we are focusing on



Poor Testing resources refer to resource being less than median

Breakdown of the Problem Statement



Hypothesizing Drivers of City Performance

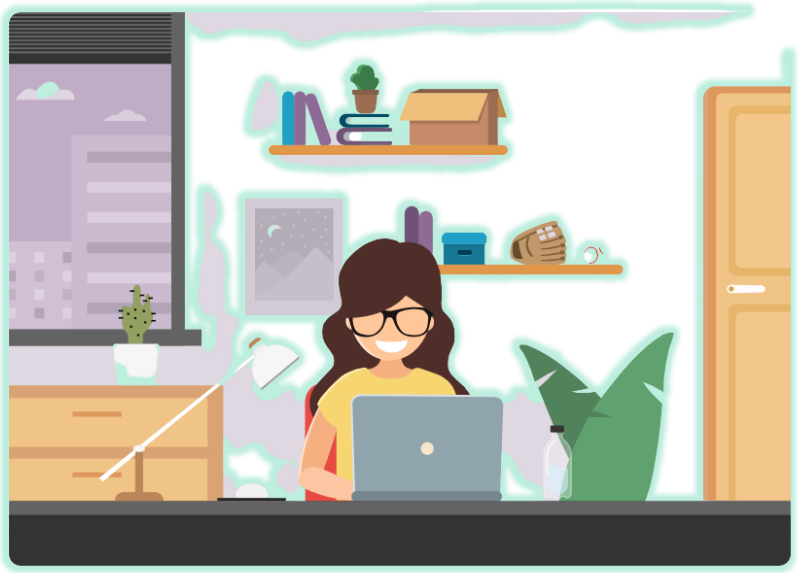
Testing Performance = **Demographic** + **Test Resources**

Controlled through Propensity Score Matching

1. Prep Test
2. Prep Course
3. Study Aids

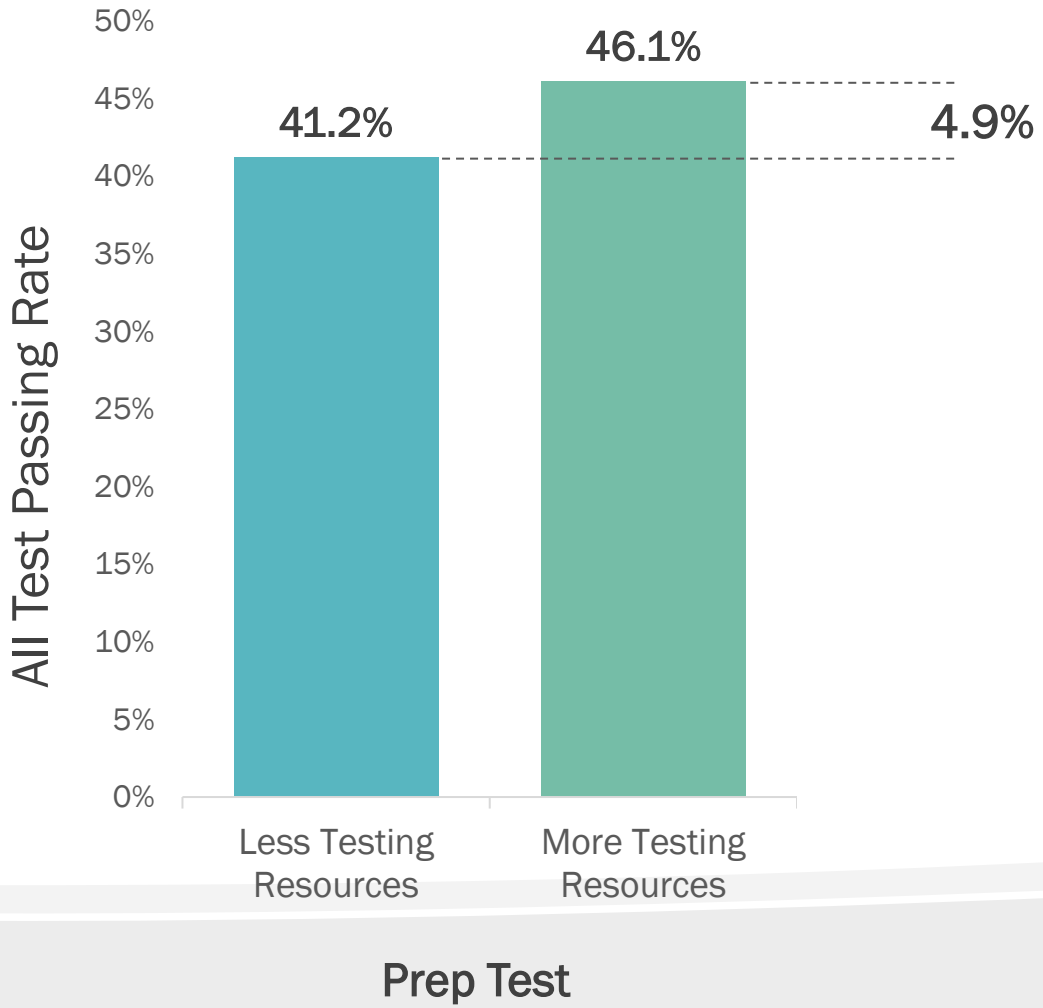
Actionable

Recommendations



Impact of Prep Test

Using linear regressions on the 1st KPI – *All Test Passing Rate.*



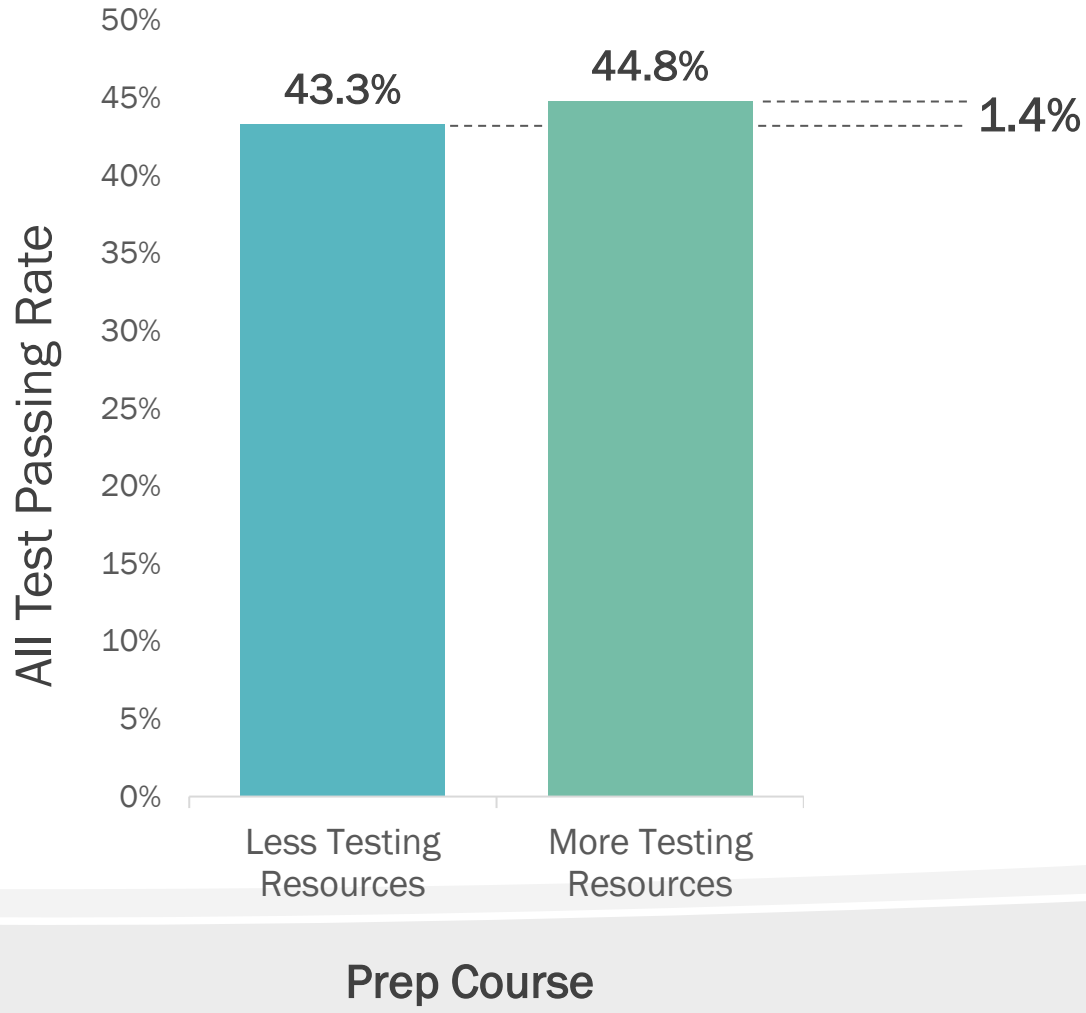
All Test Passing Rate increases by 4.9% with increase in Prep Tests taken

Recommendation #1

Encourage jurisdictions to provide vouchers for prep test in these 1,623 cities

Impact of Prep Course

Using linear regressions on the 1st KPI – *All Test Passing Rate.*



All Test Passing Rate increases by 1.4% with increase in Prep Courses taken

Recommendation #2

Encourage jurisdictions to intercept candidates of these 1,623 cities with Prep Course

Impact of Study Aids on Subject-Wise Passing Rate

Math	Social Studies	Science	Reasoning
Study Prep Center +4%	Printed Study Material +2.1%	Printed Study Material +3%	-
-	Online Video Study Material +2.1%	Adult Education Teacher +2.3%	-
-	-	Online Video Study Material +2.1%	-

Efficiently Allocate Resources Toward Study-Aids

Recommendation #3: Strategize resource allocation based on the helpfulness of the Study Aid

Math	Social Studies	Science	Reasoning
Study Prep Center +4%	Printed Study Material +2.1%	Printed Study Material +3%	-
-	Online Video Study Material +2.1%	Adult Education Teacher +2.3%	-
-	-	Online Video Study Material +2.1%	-

Recap of Recommendations

For these 1,623 poorly performing cities,

1

Encourage jurisdictions to provide vouchers for Prep Test

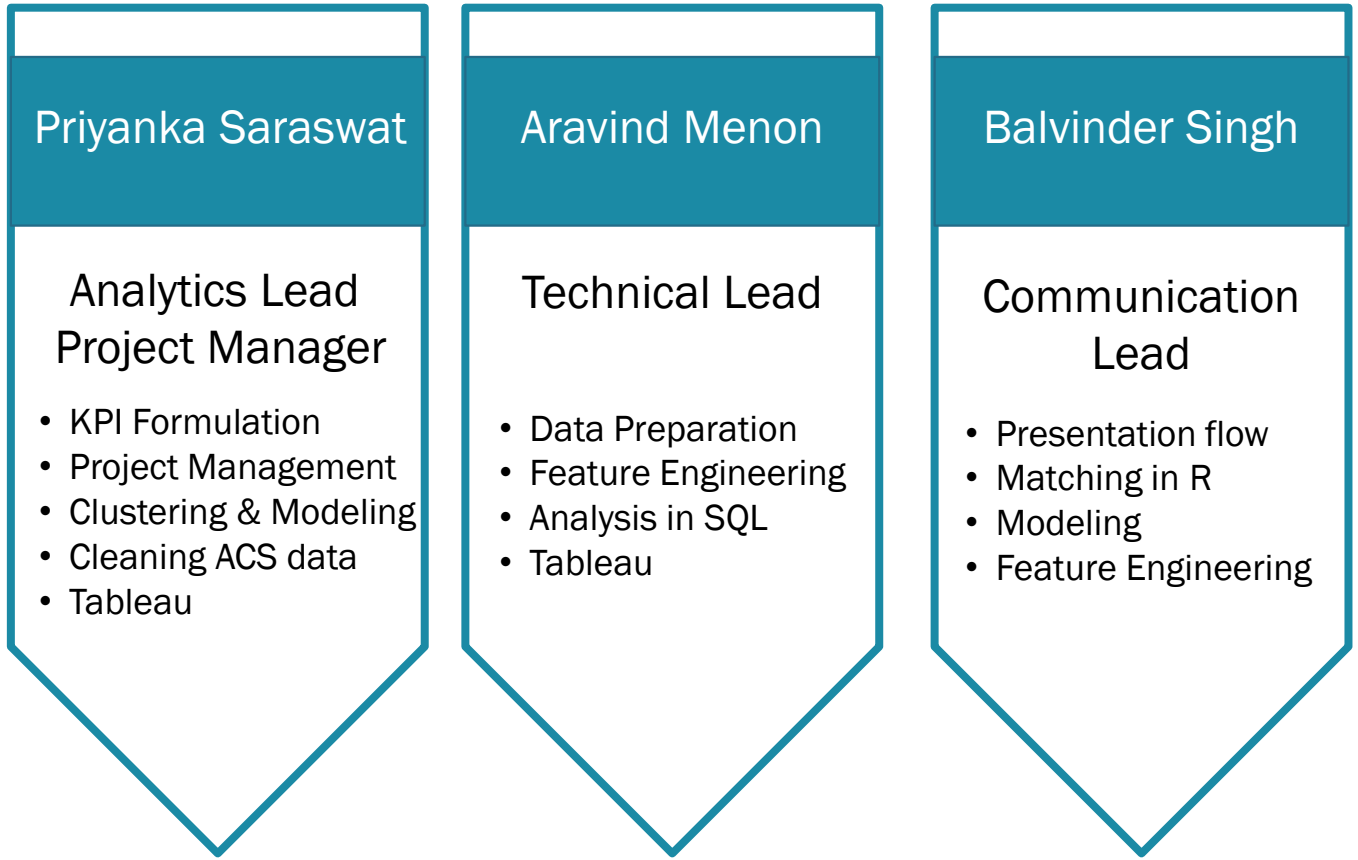
2

Encourage jurisdictions to intercept candidates with Prep Course

3

Efficiently Allocate Resources Toward Study-Aids

Team Roles and Responsibilities



Thank You

1623 Cities on the US Map

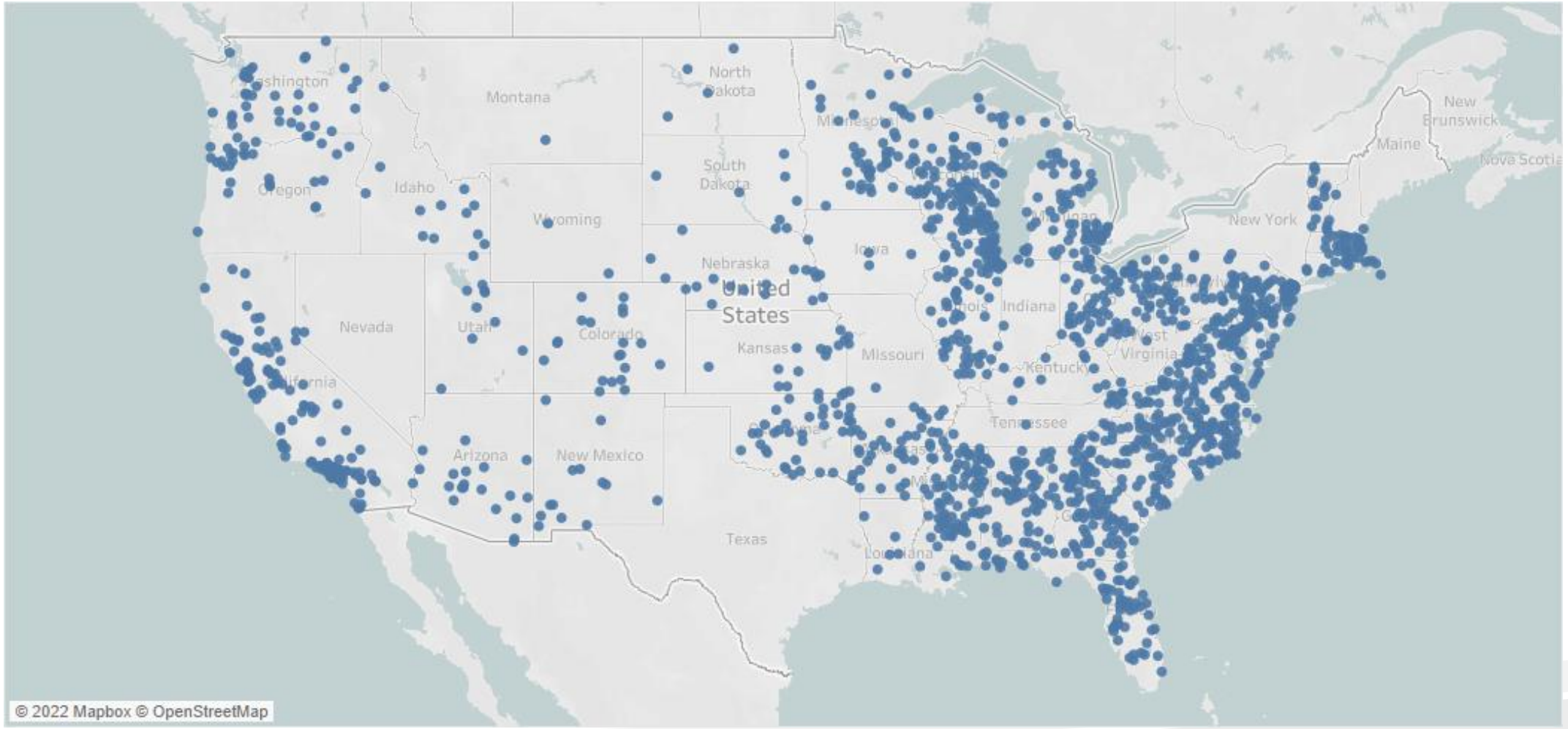
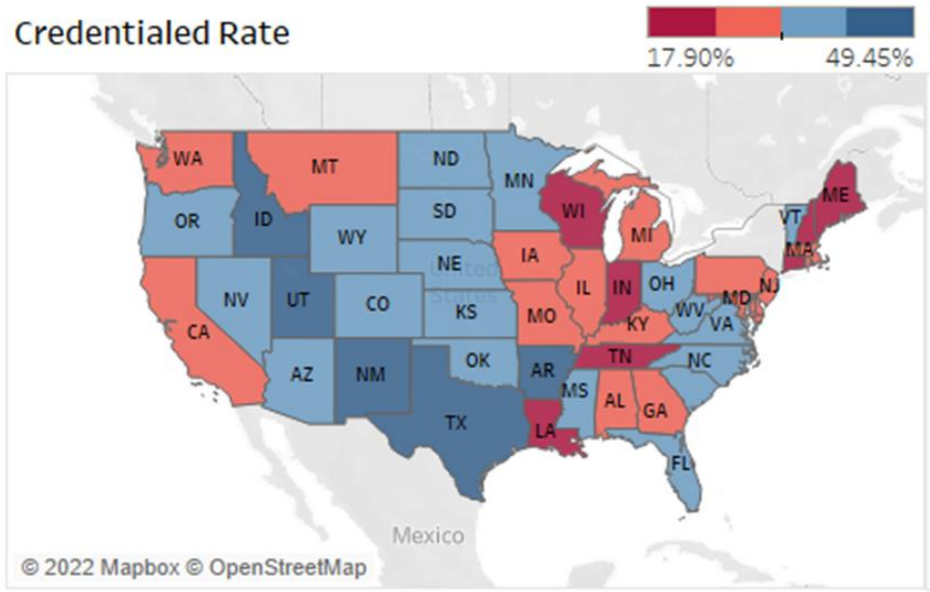
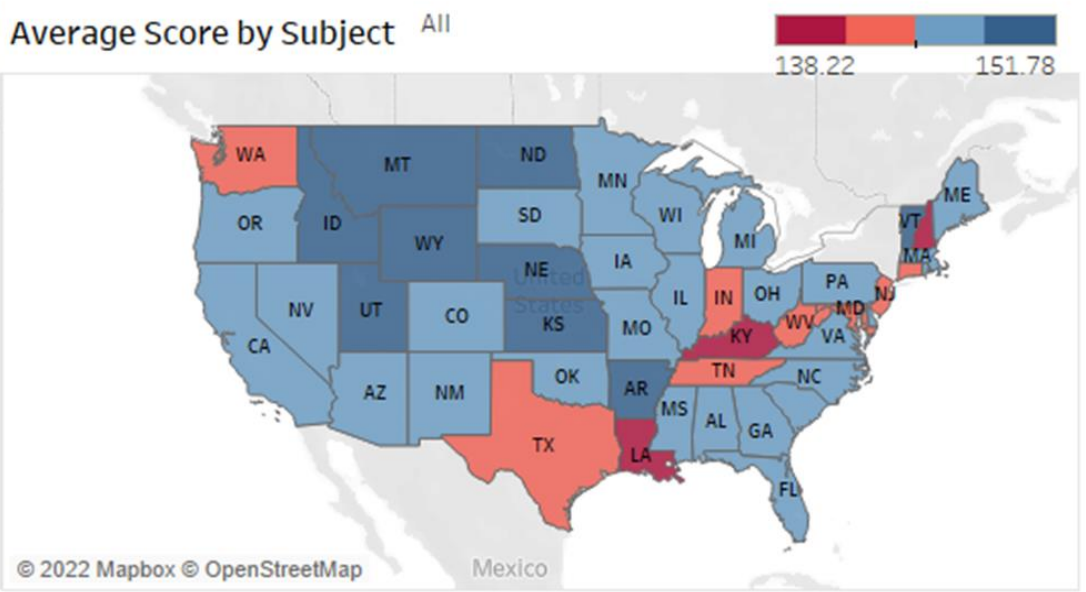


Tableau Dashboard

National Average Score	Average # of Months to Credential	Total # of Candidates Credentialed	% of Candidates Credentialed	% of Tests Passed
146.2	5.114	153,492	34.16%	66.84%





Testing Center Resources

Recommended City	Number of Candidates	Number of GED Tests taken	Number of Test Centers
Anthony	115.0	411.0	9.0

Preparation Resources

Recommended City	Average number of Prep Tests taken by a Candidate	Number of Candidates taking Prep Course
Anthony	3.496	2.000

In the above Dashboard, we have filtered on state = 'Texas'. Other states can be filtered by clicking on the same in the maps in the dashboard.