National Assessment of Educational Progress and Technology and Engineering Literacy

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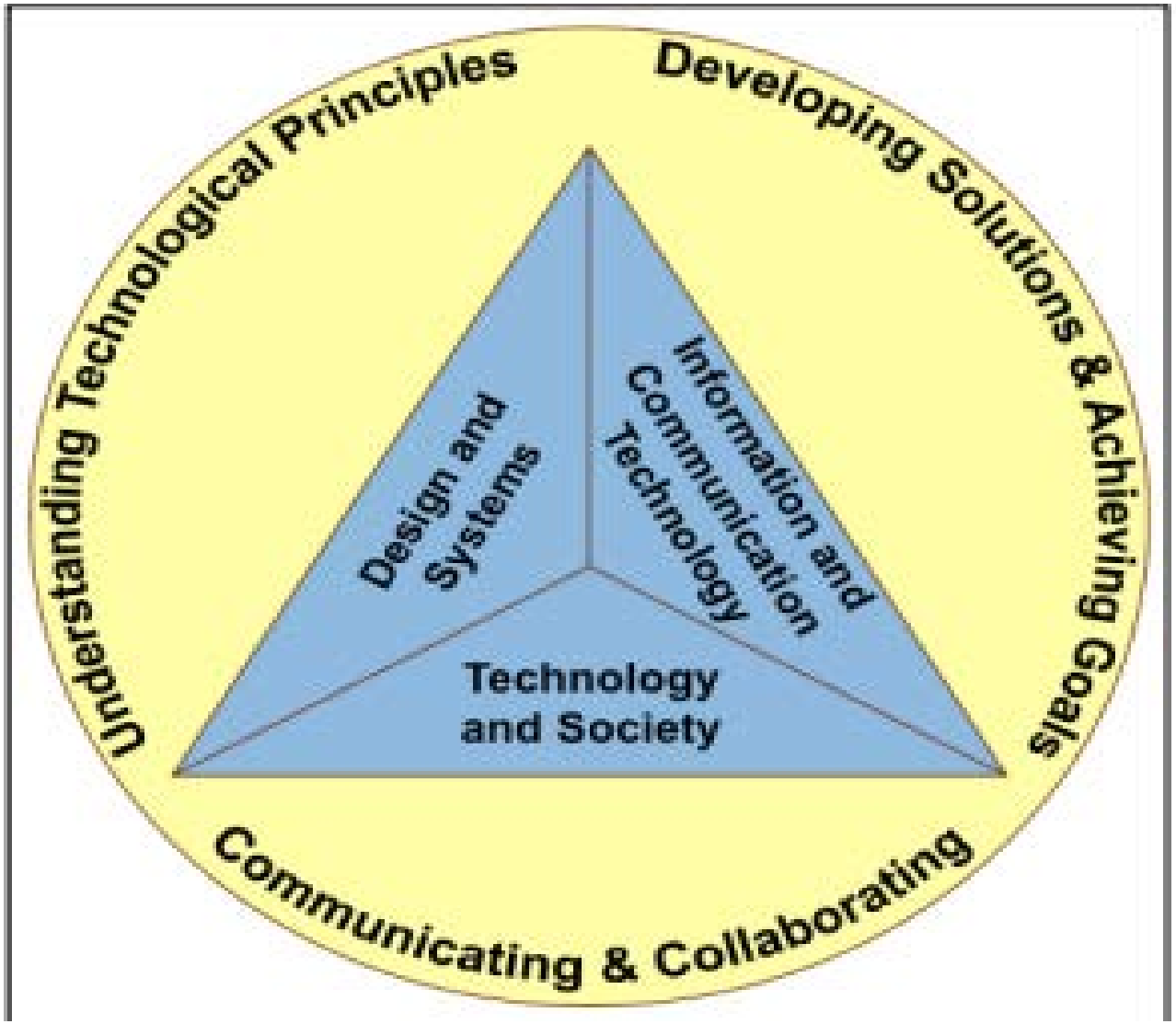
Ohio | Department of Education

NAEP's Technology and Engineering Literacy (TEL)?

- Innovative assessment
- Interactive -- real world tasks involving technology & engineering challenges
- 2014(baseline): Gr. 8

  21,500 students/840 schools
- 2018 Grade 8

Technology & Engineering Literacy



3 Content Areas

- **Technology & Society:** effects that tech. has on society and environment as well as the ethical questions raised by those effects
- **Design & Systems**: nature of tech and the processes used to develop technologies as well as basic principals for dealing with everyday tech.
- **Information/Communication Technology**: software & systems used to access, create and communicate information

TEL Practices

- **Understanding Technological Principals**: students are able to use their knowledge about tech.
- **Developing Solutions & Achieving Goals**: students' systematic use of technological knowledge/tools/skills to solve problems—achieve goals
- **Communicating & Collaborating**: students use contemporary tech. to communicate for a variety of purpose and variety of ways

TEL Assessment Targets

Each practice has assessment targets –*what students know and can do in tech. and engineering literacy* – for each content area.

https://nationsreportcard.gov/tel_2014/#about/areas

Assessment Overview

- Overall Assessment 70-90 minutes
- Tutorial
- Content: Two 30-minutes sections (task/questions)
- Survey – opportunities to learn about technology and engineering in/out of school

Content Section

- Two 30-minutes sections (task/questions)
- Section
  - ❖ 30 minute task (long)
  - ❑ three 10 minute sets of discrete questions
  - ❑Combination of short task (10 or 20 minutes) & discrete question set

TEL Content

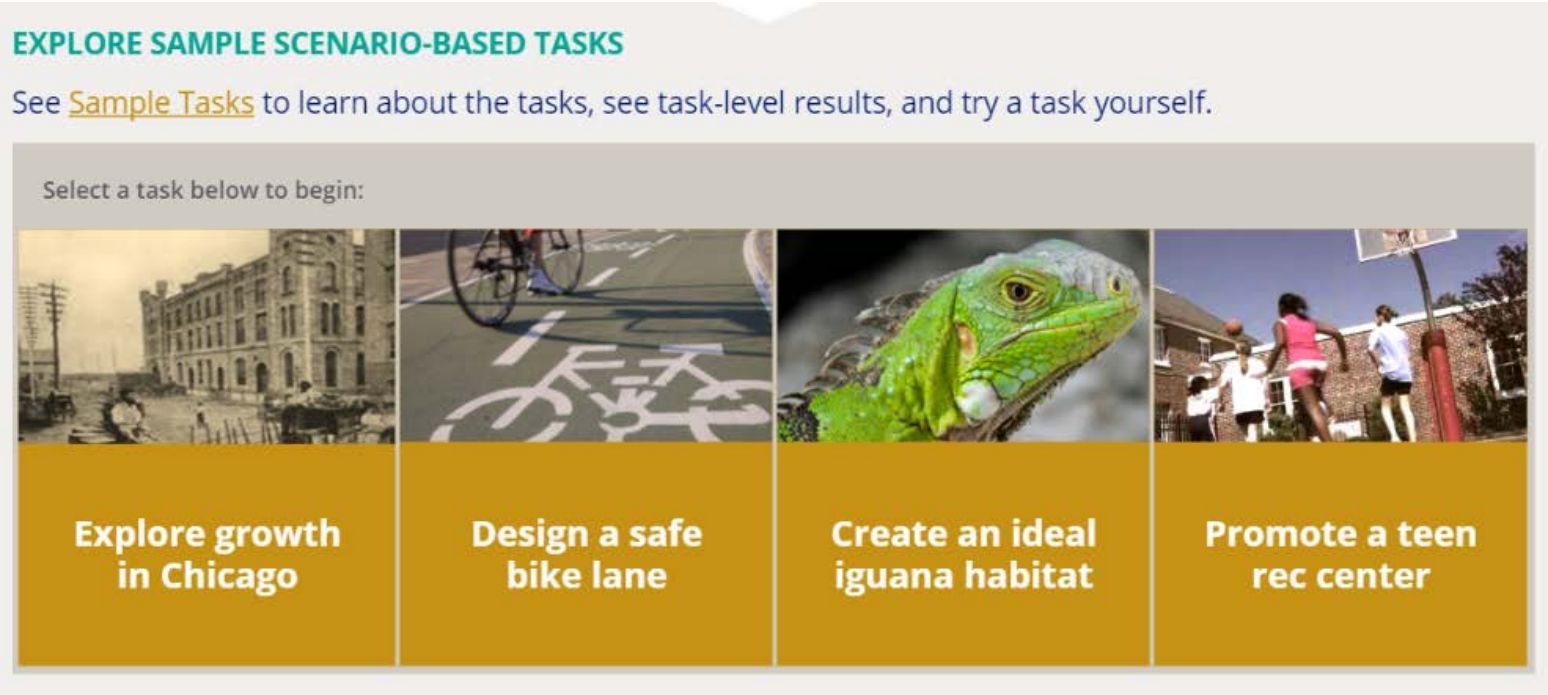
Scenarios: multimedia, interactive with selected/constructive-response items

- Some measure performance in one content area & one practice
- More than one content or practice area
- Pool of 20 scenario-based tasks (SBTs)

Discrete questions :

independent measures of knowledge & skill

Sample Scenario-Based Tasks for Taking



From: http://nationsreportcard.gov > TEL results page at the bottom

Sample Scenario- Based Task

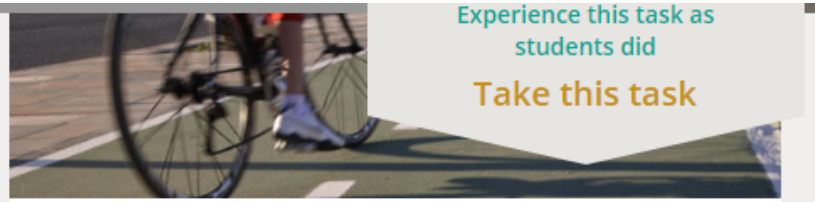
Design a safe bike lane

In the *Bike Lanes* task, a city is encouraging its citizens to use bicycling as a form of transportation. Students need to apply the engineering design process to come up with a route design for a safe bike lane. Similar to what engineers face when tackling a problem, students need to produce a design that meets specific requirements while accounting for trade-offs between options including cost and safety.

CONTENT AREA: Design and Systems
PRACTICE: Developing Solutions and Achieving Goals
TASK TIME: 18 minutes

Learn about content areas and practices

EXPLORE TASK DETAILS BY SELECTING A STEP BELOW
or take this task to experience what students did



SELECTED FINDINGS FROM THIS SAMPLE TASK:

Most students understood the requirements for a final design but were less able to carry out a design process and explain a design rationale involving trade-offs between solutions.

76% of students were able to identify the requirements for a design.

45% of students successfully carried out a design using trade-offs to choose between alternative solutions.

11% of students were able to communicate a design rationale that clearly explained the role of trade-offs in their design decision.

Log on

- Use Chrome or Firefox
- https://www.nationsreportcard.gov/tel_2014/
- Google: Nation's Report Card:
  - Reports (tab at top)
  - Select Technology & Engineering Lit
  - Sample Task tab in blue bar
  - Scroll down – Iguana in gold bar
  - Scroll down to Take This Task window

Iggy the IGUANA

- Introduction
- Vocabulary
- Prerequisites or Prior Knowledge
- Related activities or extensions

Students results: End of task to print or copy into Word

YOUR ANSWER:

- **Option Selected:** Add a stronger heat lamp to Iggy's cage. [Correct]
- **Student's Explanation:** Iggy's too cold, extra heat will help him stay away from clinging.

SAMPLE COMPLETE STUDENT RESPONSE FROM ASSESSMENT:

Option selected: Add a stronger heat lamp to Iggy's cage.

Student's explanation: Since Iggy is used to extreme heat in the day, and is always trying to hang on to his heat lamp, this suggests that he needs more heat coming to him. Adding a stronger heat lamp to Iggy's home would affect him better than the other choices because adding a rock for him to lie on would not make him warmer, putting a blanket at the bottom of his cage would not make him warmer, either, and moving Iggy's branch closer to the heat lamp would help in a small way, but not as much as adding a stronger heat lamp. We want to make Iggy feels as comfortable as possible.

SCORING GUIDE:

Complete:
The option selected is Add a stronger heat lamp to Iggy's cage and the response provides a reasonable explanation of how the stronger lamp would best solve the presented problem (Iggy is too cold). The response also explains why the lamp is better than at least one of the alternatives.

RESULTS FOR STUDENTS ON THIS QUESTION

Percentage of eighth-grade students in each response category: 2014

Response category	Percentage
Complete	12
Partial	69
Unsatisfactory/Incomplete	19
Omitted	#

Rounds to zero.

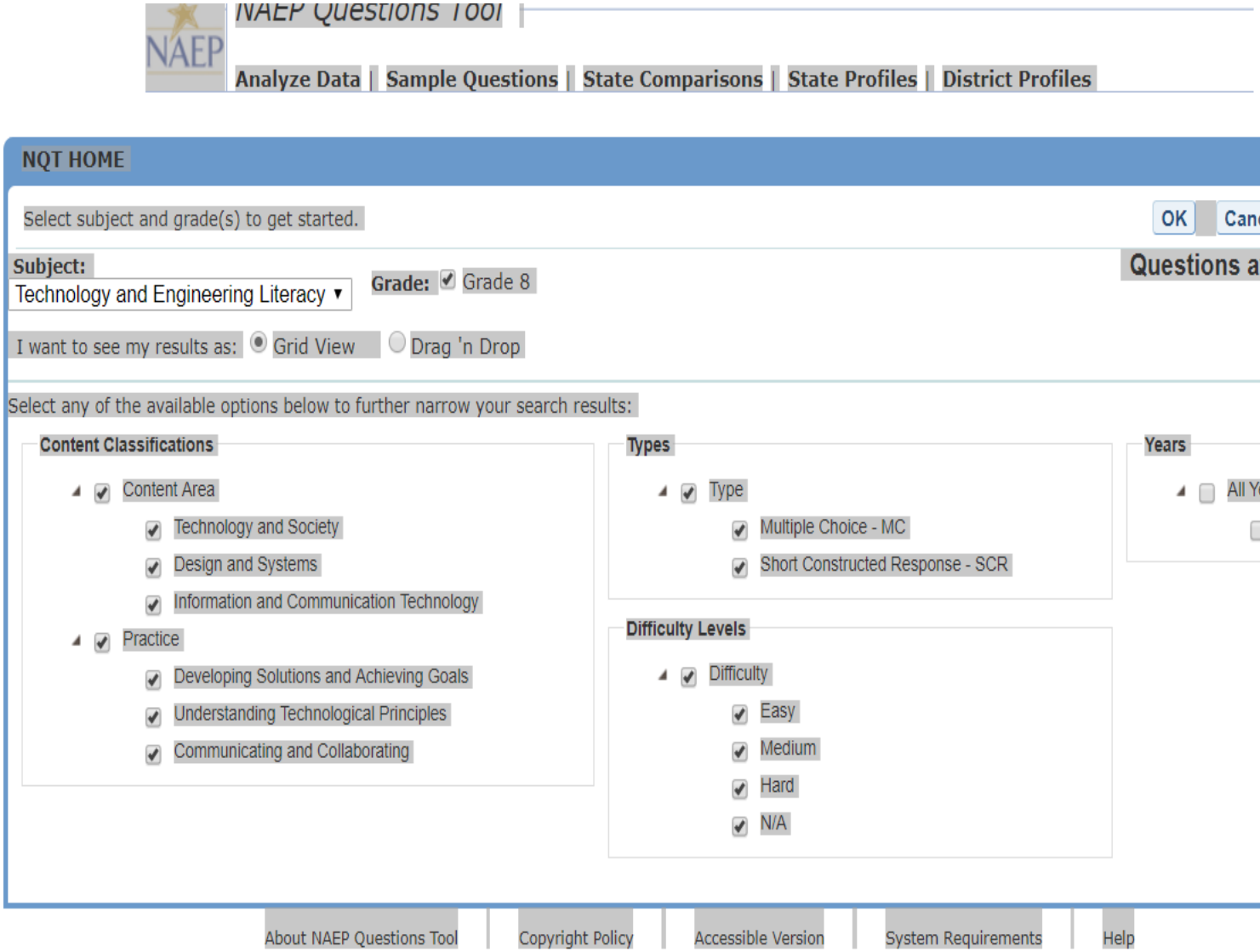
See what students at each achievement level are likely to know and can do.

NAEP Question Tool

- https://nces.ed.gov/nationsreportcard/nqt/
- Select Question Tool --Search Questions
- Subject: Technology and Engineering Literacy Grade 8

- Create a Test—Assign Task?

NQT: TEL


NAEP Questions Tool
Analyze Data | Sample Questions | State Comparisons | State Profiles | District Profiles
NQT HOME
Help
Select subject and grade(s) to get started.
OK
Cancel
Reset
Subject:
Technology and Engineering Literacy
Grade:
Grade 8
Questions available: 24
Get Count
I want to see my results as:
Grid View
Drag 'n Drop
Select any of the available options below to further narrow your search results:
Content Classifications
Content Area
Technology and Society
Design and Systems
Information and Communication Technology
Practice
Developing Solutions and Achieving Goals
Understanding Technological Principles
Communicating and Collaborating
Types
Type
Multiple Choice - MC
Short Constructed Response - SCR
Difficulty Levels
Difficulty
Easy
Medium
Hard
N/A
Years
All Years
2014
About NAEP Questions Tool
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TEL Results National 2014

Overall Results

Highlights of what we learned about eighth-grade students include the following:

Female
students scored
3 pts
higher than
male
students.

NSLP[1] not eligible
students scored
28 pts
higher than
eligible
students.

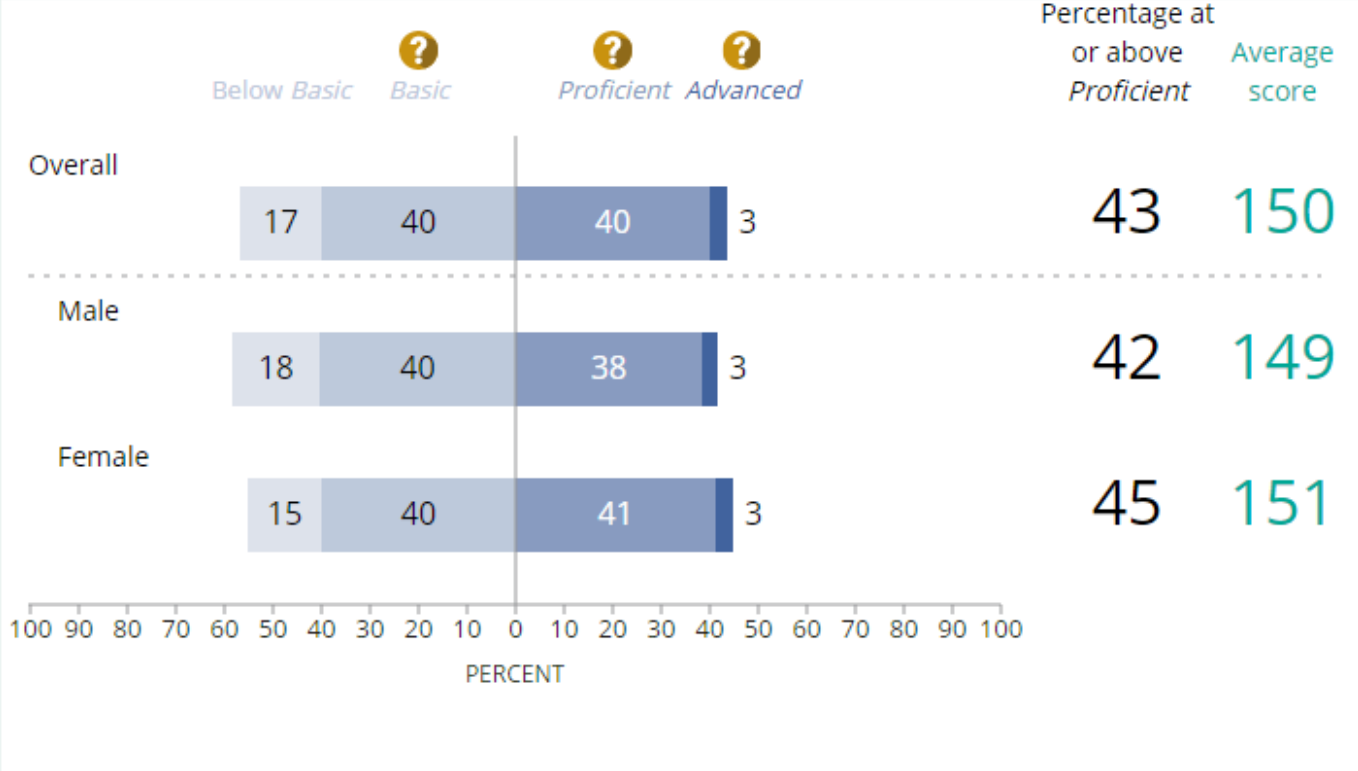
[1] NSLP = National School Lunch Program.

reported **figuring out why something was not working in order to fix it** outside of their school work.

reported **using a computer to create, edit, or organize digital media** at least once a month in school.

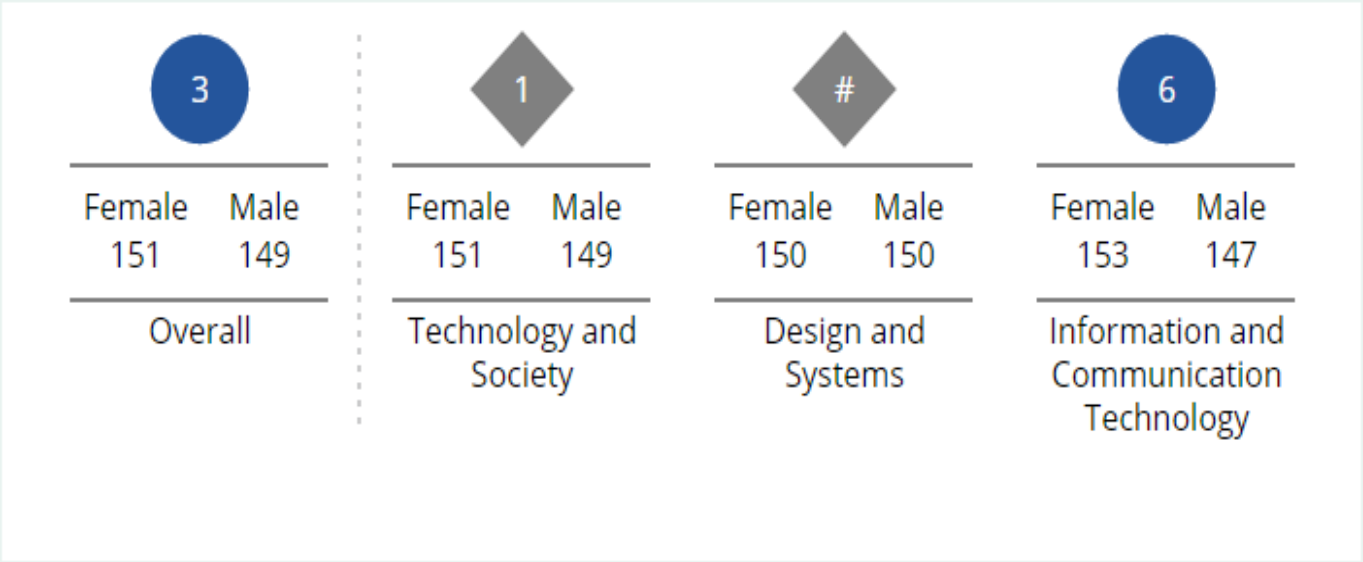
Results By Gender

Achievement level results for eighth-grade students assessed in NAEP technology and engineering literacy (TEL), by gender: 2014



Scale Scores By Gender

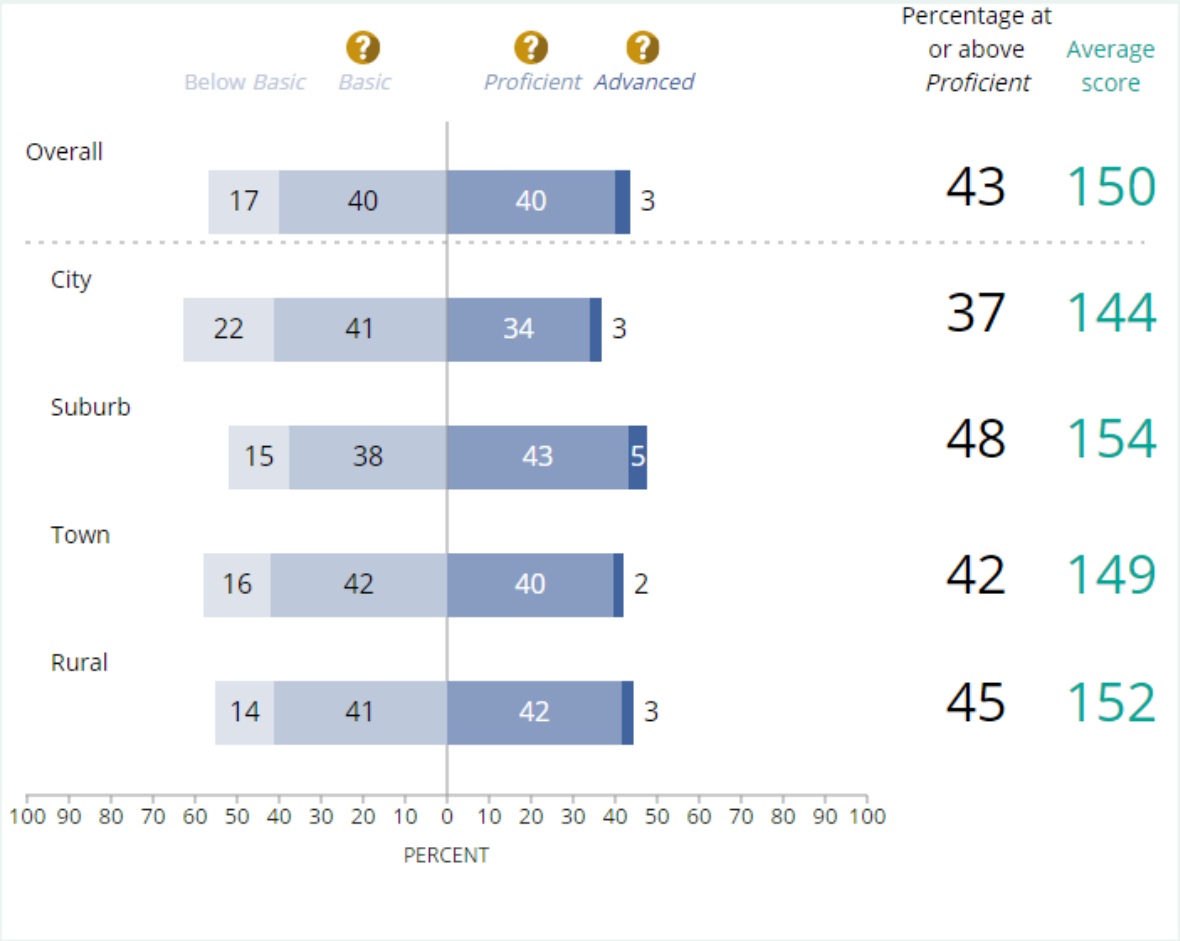
Average scores and score differences for eighth-grade students assessed in NAEP technology and engineering literacy (TEL), by gender and TEL content areas: 2014



Rounds to zero.
NOTE: Score differences are calculated based on the difference between unrounded average scores.

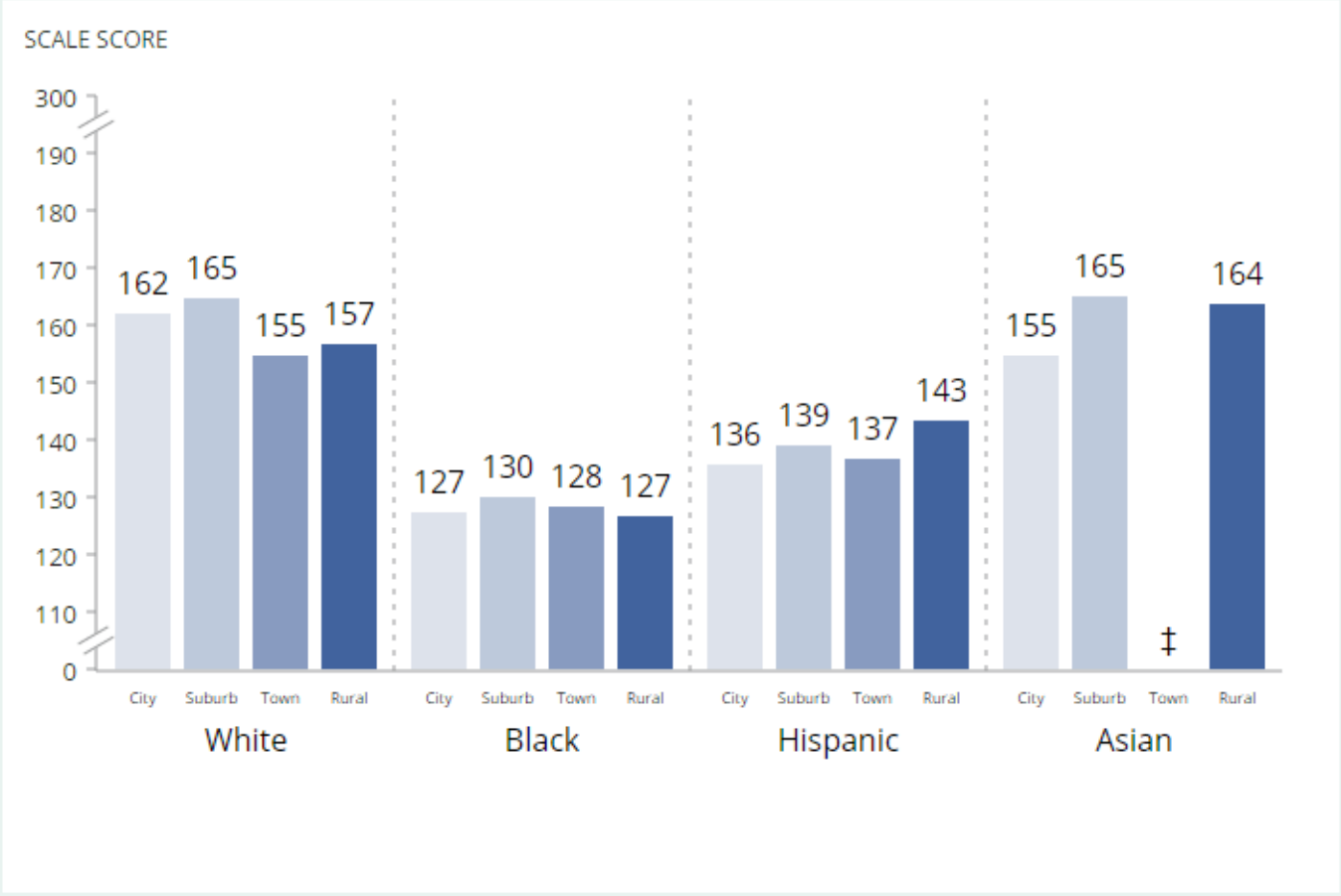
Results By School Location

Achievement level results for eighth-grade students assessed in NAEP technology and engineering literacy (TEL), by school location: 2014



Results By Race/Ethnicity and Location

Average scores of eighth-grade students assessed in NAEP technology and engineering literacy (TEL), by race/ethnicity and school location: 2014



City
Suburb
Town
Rural

‡ Reporting standards not met. Sample size insufficient to permit a reliable estimate.

Links

- More scenario-based tasks can be found at: https://www.nationsreportcard.gov/tel_2014/#tasks/overview

- More information can be found at: https://nationsreportcard.gov/tel_2014/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