# TECHNOLOGY GUIDELINES FOR PARCC ASSESSMENTS VERSION 7.0 – 2017-2018

Updates and additional technology resources are available at:  **http://parcc.pearson.com**

*PLEASE NOTE: Technology Guidelines for PARCC Assessments v7.0* are based on TestNav v8.9 specifications. TestNav v8.9 will be used for the 2017-2018 school year.

# Contents

| Change Log – Updated July 2017 | |
|---|---|
| **Added support** | MacOS 10.12 Sierra using the TestNav Desktop App |
| **Removed support** | Operating systems:  Chrome OS version 50 through 56, **iOS 9**, Android 5 and 6 |
| | Browser version:  Firefox 45 (ESR) |
| | |

**Note:**  If assistance is needed, contact the PARCC Support Center at **888-493-9888** or visit **PARCC.Pearson.com/support/** and select **Contact PARCC Support.**

## Technology Guidelines Overview

The Partnership for Assessment of Readiness for College and Careers (PARCC) has assembled these technology guidelines to inform schools and districts as they make technology decisions to best meet the instructional and assessment needs of their students. The information in this document is intended to help schools, districts, and states determine the level of readiness of their existing device inventories and the new instructional hardware they may need to purchase as they implement the Common Core State Standards; and to evaluate whether they will meet PARCC's 2017-2018 minimum requirements for computer-based assessment administration.

**This document provides two sets of guidance regarding technical specifications:**

### Minimum Specifications
Minimum Specifications address the oldest operating systems and lowest levels of hardware capacity that can reasonably be compatible with PARCC computer-based assessments in 2017-2018.
- Minimum Specifications apply to existing school technology inventories.
- Devices meeting the Minimum Specifications can be considered as satisfying PARCC guidelines for **2017-2018**.

Considerations regarding devices meeting, but not exceeding, Minimum Specifications:
- PARCC recommends that schools upgrade or replace devices that have older operating systems and computers with lower memory in order to raise their capacity to Recommended Specifications levels as soon as possible.
- Devices that meet only the Minimum Specifications will be compatible with the PARCC assessment delivery platform, but may be more likely to experience slower performance than higher capacity devices.

### Recommended Specifications
Recommended Specifications outline the levels of device and network capacity that are more likely to meet growing demands for school technology that supports learning, assessment, and administrative uses simultaneously across classrooms.
- Recommended Specifications apply to both existing inventory and new hardware purchases.
- Devices meeting the Recommended Specifications can be expected to satisfy PARCC guidelines through 2017-2018 school year.

## DEVICE AND BROWSER SPECIFICATIONS FOR PARCC ASSESSMENTS

Devices that will be supported for the **PARCC Assessments** include selected Windows, Mac, and Linux desktops and laptops, Chromebooks, thin client/VDI systems, and tablets (iOS, Windows, and Android). These devices will be compatible provided they meet the established hardware, operating system, browser and networking specifications; and, are able to address the security requirements described in the following sections.

Browsers and installable TestNav applications that will be supported for the **PARCC Assessments** are detailed below based on operating system. Schools using the Linux OS, Chromebooks, iPads, or Android tablets, will need to download the TestNav Desktop app and therefore do not have specific web browser requirements. *TestNav Desktop* is an installable TestNav client designed to reduce dependency on the Java plug-in used by Internet browsers and simplify device readiness.

Multiple new Operating Systems are scheduled for release this year. Pearson is working closely with partners at Apple, Google, and Microsoft to determine if, and when, any of those new Operating Systems will be supported by the PARCC online testing platform (TestNav). Additional information will be communicated as new releases are supported.

### Required Specifications for All Devices:

| | |
|---|---|
| **Assistive Technologies** | Assistive technologies, in addition to the input devices listed in these guidelines, may be needed for students requiring accommodations. Refer to the <u>PARCC Assistive Technology Guidelines</u> document for guidance on use of other devices. |
| **Headphone/Earphone/ Ear Bud Requirements** | Headphones are needed for **all English Language Arts/Literacy (ELA/L) units,** and for students who receive the text-to-speech accommodation for the ELA/L assessments or the accessibility feature for the Mathematics assessments.<br><br>Stand-alone headphones (i.e., headphones not connected to a device) are also an accessibility feature; therefore, some students may use headphones as noise buffers to minimize distractions or filter external noise during testing. |
| **Browser Dependencies Including Java Runtime Plugin**<br><br>**(Browser-based TestNav only; not applicable for TestNav Desktop implementations)** | For proper functioning of browser-based TestNav, the following must be enabled:<br>• Java runtime plugin version based on operating system<br>• Windows firewall configured to allow javaw.exe to communicate<br>• Allow pop-ups for Pearson sites<br>• Allow local file access to home directory<br>• Devices running on Thin Clients must use Firefox ESR version 52.<br><br>*Firefox ESR Version 52 (32-bit)*<br>Java Version 1.8 and higher<br><br>Note: Oracle Corporation has posted notice that Java updates were scheduled on the following dates:<br>• January 17, 2017<br>• April 18, 2017<br>• July 18, 2017 |

| | |
|---|---|
| | PARCC will share additional information as it becomes available, but Technology Coordinators should prepare for the possibility of updating their school or district's online testing devices when Java updates are released. |
| | To check the most current release, please go to: |
| | https://www.oracle.com/technetwork/topics/security/alerts-086861.html#CriticalPatchUpdates |
| **Firewalls, Content, and Spam Filters** | Firewalls, content, and spam filters must be set to allow access to Pearson domains. |
| | The following must be opened in any firewalls, proxy servers, or software that is used for Internet content filtering: <br>• *.testnav.com:80 <br>• *.testnav.com:443 <br>• *.pearsontestcontent.com <br>• *.thawte.com <br>• *.usertrust.com *(new)* <br>• *.comodoca.com *(new)* <br>• *.google-analytics.com (recommended, but not required) |
| | In addition, when using Pearson-supplied proctor caching you must configure the local area network firewall software and content filters to allow traffic on both of the ports listed below: <br>• port 4480 <br>• port 4481 |
| **Security** | For the PARCC assessments, eligible devices of any type (desktop, laptop, tablet, Chrome device, thin client) or operating system (Windows, Mac, Linux, iOS, Chrome OS, Android) must have the administrative tools and capabilities to "lock down" the device to temporarily disable features, functionalities, and applications that could present a security risk during test administration and should not prevent a PARCC secure browser or other test software from loading on the computer during lock down mode. The operating systems listed above meet this requirement for PARCC assessments, but provide different mechanisms for managing user security settings at the individual device and/or enterprise levels. School technology coordinators must be familiar with the particular requirements of the systems they will be using for PARCC assessments to ensure test security is maintained. |
| | To test the security lock down settings in the TestNav App (desktop, iOS, Chrome OS, or Android): <br>1. Open the TestNav App and navigate to your state sign in page, then click the user icon in the top right and choose "App Check" from the menu. <br>   a. A success message should display within a few seconds. <br>   b. If an error message is received please review the device setup instructions for Installable TestNav at https://support.assessment.pearson.com/x/HgACAQ or contact PARCC Support. <br>2. If utilizing browser-based testing, it is strongly recommended that an Infrastructure Trial is conducted prior to the start of a test administration. An Infrastructure Trial takes place in the PearsonAccess<sup>next</sup> Training Site with generic student data. <br>   a. Login to the PARCC Training Center and generate sample students. <br>   b. Create and manage students in an Infrastructure Trial Session. <br>   c. Print Student Testing Tickets. <br>   d. Launch Firefox ESR 52 and go to the URL indicated on the Student Testing Ticket. <br>   e. Enter the Username and Password. <br>   If the test does not launch or an error is received please review the setup instructions for Browser-Based TestNav at: https://support.assessment.pearson.com/x/HwACAQ or contact PARCC |

| | |
|---|---|
| | Support.  For additional information on Infrastructure Trials, go to http://avocet.pearson.com/PARCC/Home#16165.<br><br>When preparing student test taking devices, please be sure to take the following steps to ensure test security.<br>• Check every device to ensure that all software applications, including Internet browsers, cameras (still and video), screen-capture programs (live and recorded such as Skype), email, instant messaging, application switching, media players (such as iTunes) and printing are closed on all student testing devices before the test begins. Work with your local technology staff as they may have procedures in place that provide a "clean" desktop and they will be able to provide you with easy ways to determine what applications or programs may be running on your devices.<br>• Turn off or disable any management software that would allow secure test content on student testing devices to be viewed on any other device; e.g., LanSchool, NetopVision, or similar applications.<br><br>• In addition, schools should work with their technology staff to configure the common applications listed below to NOT launch on any student test taking devices during testing sessions:<br>    o Anti-virus software performing automatic updates<br>    o Power management software on laptops warning of low battery levels<br>    o Screen savers and sleep mode<br>    o E-mail with auto message notification<br>    o Calendar applications with notifications, such as Google Calendar<br>    o Pop-up blockers |
| **External Keyboard Requirements** | PARCC highly recommends using external keyboards for tablet devices during PARCC testing to ensure equitable access to test content due to the location of the internal keyboard. Use of a tablet internal keyboard uses approximately half of the screen space. This will cause students to be unable to see the majority of the item while typing extended responses for both mathematics and ELA/L without extensive scrolling. In mathematics, students will also be unable to type in the text box at the same time as using the online calculator.<br><br>Local education agencies (LEAs)/districts are responsible for determining whether external keyboards will be used for tablet devices for PARCC testing; this decision should be consistent with what is used during instruction. Schools and LEAs/districts must ensure that students have sufficient opportunity for practice prior to testing:<br><br>• If a school is using underline external keyboards for PARCC testing, ensure students have ample opportunity to practice with the external keyboard prior to testing.<br>• If a school is using the underline internal keyboards, ensure students have completed the PARCC practice extended-response items in both mathematics and ELA/L and understand the need for additional scrolling.<br><br>External keyboards must allow students to enter letters, numbers, and symbols and to shift, tab, return, delete, and backspace. Tablet touchscreen interfaces can be used for student interactions with the assessments other than text input, including to select/deselect, drag, and highlight text, objects, and areas. Keyboards may be wired or wireless. To meet security guidelines, each Bluetooth/wireless keyboard must be configured to pair with only a single device during assessment administration. |
| **Operating System Specific Accessibility Features** | Some device operating systems include embedded accessibility supports that include Speech-to-Text and Text-to-Speech functionality. These supports should be disabled on all devices used for the PARCC assessment. There may be exceptions based on allowable supports identified in the |

| | PARCC Assistive Technology Guidelines document (i.e. iOS Voiceover). If allowed, they should only be used as specified by the PARCC Accessibility Features and Accommodations Manual.<br><br>Examples of embedded device supports are provided within each device section provided below. |
|---|---|
| **Additional Guidance** | [1] Windows 8 RT (Runtime) is not supported.<br><br>[2]*TestNav Desktop* can be downloaded here: http://download.testnav.com/<br><br>[3]Each computer operating in a thin client environment must meet or exceed minimum hardware specifications, as well as bandwidth and security requirements. Schools utilizing virtual solutions are strongly encouraged to complete the Infrastructure Trial process prior to the start of the online testing windows to verify successful test delivery. |

## WINDOWS:  PARCC ASSESSMENT SPECIFICATIONS FOR DESKTOPS, LAPTOPS, AND TABLETS

| Operating Systems Supported for PARCC Assessments[1] | Platform Specifications for Windows Operating Systems | |
| --- | --- | --- |
| | *Firefox ESR Version 52 (32-bit)* | *TestNav Desktop[2]* |
| **Windows 7** *Recommended Specification* | Yes | Yes |
| **Windows 8.1** *Recommended Specification* | Yes | Yes |
| **Windows 10** *Recommended Specification* | Yes | Yes |
| **Specifications for Windows, Desktop, Laptop, Netbook, and Thin Client[3]/VDI Computers** | | |
| | *Minimum Specifications* | *Recommended Specifications* |
| **Memory** | 2GB RAM or greater | 4GB RAM or greater |
| **Processor** | Any processor | Any processor |
| **Connectivity** | Computers must be able to connect to the Internet via wired or wireless networks. | Computers must be able to connect to the Internet via wired or wireless networks. |
| **Screen Size** | 9.5-inch screen size or larger | 9.5-inch screen size or larger |
| **Screen Resolution** | 1024 x 768 | 1024 x 768 |
| **Input Device Requirements** | Keyboard – wired or wireless/Bluetooth mouse or touchpad | Keyboard – wired or wireless/Bluetooth mouse or touchpad |
| **Windows OS Accessibility Features** | Windows Narrator, Windows Speech Recognition, Sticky Keys | |

## MAC OS: PARCC ASSESSMENT SPECIFICATIONS FOR DESKTOPS AND LAPTOPS

| Operating Systems Supported for PARCC Assessments | Platform Specifications for Mac Operating Systems | |
| --- | --- | --- |
| | *Firefox ESR Version 52* | *TestNav Desktop[1]* |
| **OS 10.9** *Minimum Specification* | Yes | Yes |
| **OS 10.10** *Recommended Specification* | Yes | Yes |
| **OS 10.11** *Recommended Specification* | Yes | Yes |
| **OS 10.12** *Recommended Specification* | Yes | Yes |

| Additional Specifications for Mac Desktop and Laptop Computers | | |
|---|---|---|
| | *Minimum Specifications* | *Recommended Specifications* |
| **Memory** | 2GB RAM or greater | 4GB RAM or greater |
| **Processor** | Any processor | Any processor |
| **Connectivity** | Computers must be able to connect to the Internet via wired or wireless networks. | Computers must be able to connect to the Internet via wired or wireless networks. |
| **Screen Size** | 9.5-inch screen size or larger | 9.5- inch screen size or larger |
| **Screen Resolution** | 1024 x 768 | 1024 x 768 |
| **Input Device Requirements** | Keyboard – wired or wireless/Bluetooth mouse or touchpad | Keyboard – wired |
| **MacOS Accessibility Features** | VoiceOver, Sticky Keys | |

## CHROME OS: PARCC ASSESSMENT SPECIFICATIONS FOR CHROMEBOOKS AND CHROMEBOXES

| Operating Systems Supported for PARCC Assessments | Platform Specifications for Chromebook Operating Systems |
|---|---|
| **Chrome OS 50+**<br>*Required Specification* | No Browser Requirement. The installation of a Chrome OS-specific TestNav App is required. |

Chrome OS cannot run Java, therefore, TestNav cannot lock down the device via a standard web browser. A secure Chrome OS-specific application, which is available for free in the Chrome Store, is utilized instead. We recommend that all Chrome OS users use the Chrome Admin console to manage devices in order to ensure that the app is always refreshed and up to date. Schools should check to make sure they have the latest version of the app prior to the start of their test window. To download and install the app, go to: https://support.assessment.pearson.com/display/TN/Set+Up+TestNav+on+Chrome+OS.

Encrypted Student Response Files (SRFs) will be saved locally through this application. Follow these steps to ensure SRF and log files are not deleted.

- From the **Admin Console**, select **Device Management** > **Chrome** > **Device Settings**
- In the **User Data** section, ensure that "**Do not erase all local user data**" is selected.

| Specifications for Chromebooks and Chromeboxes | | |
|---|---|---|
| | *Minimum Specifications* | *Recommended Specifications* |
| **Memory** | 2GB RAM or greater | 4GB RAM or greater |
| **Processor** | Any processor | Any processor |
| **Connectivity** | Computers must be able to connect to the Internet via wired or wireless networks. | Computers must be able to connect to the Internet via wired or wireless networks. |

| Specifications for Chromebooks and Chromeboxes | | |
|---|---|---|
| Screen Size | 9.5-inch screen size or larger | 9.5-inch screen size or larger |
| Screen Resolution | 1024 x 768 | 1024 x 768 |
| Input Device Requirements | Keyboard – wired or wireless/Bluetooth mouse or touchpad | Keyboard – wired or wireless/Bluetooth mouse or touchpad |
| Chromebook Auto Update Policy | https://support.google.com/chrome/a/answer/6220366?hl=en | |
| Chrome OS Accessibility Features | ChromeVox, Sticky Keys | |
| Other | Convertible Chromebooks cannot be used in tablet mode | |

## LINUX: PARCC ASSESSMENT SPECIFICATIONS FOR DESKTOPS AND LAPTOPS

| Operating Systems Supported for PARCC Assessments | Platform Specifications for Linux Operating Systems | |
|---|---|---|
| **Fedora 24 (64-bit)** *Recommended Specification* | No Browser Requirement. The installation of *TestNav Desktop* is required. | |
| **Ubuntu 16.04 (64-bit)** *Recommended Specification* | No Browser Requirement. The installation of *TestNav Desktop* is required. | |
| Additional Specifications for Linux Desktop, Laptop, Netbook, and Thin Client[2]/VDI Computers | | |
| | *Minimum Specifications* | *Recommended Specifications* |
| **Memory** | 1GB RAM or greater | 2GB RAM or greater |
| **Processor** | Any processor | Any processor |
| **Connectivity** | Computers must be able to connect to the Internet via wired or wireless networks. | Computers must be able to connect to the Internet via wired or wireless networks. |
| **Screen Size** | 9.5-inch screen size or larger/ "10-inch class" tablets or larger | 9.5-inch screen size or larger/ "10-inch class" tablets or larger |
| **Screen Resolution** | 1024 x 768 | 1024 x 768 |
| **Input Device Requirements** | Keyboard – wired or wireless/Bluetooth mouse or touchpad | Keyboard– wired or wireless/Bluetooth mouse or touchpad |
| **Linux OS Accessibility Features** | N/A | |

## iOS: PARCC ASSESSMENT SPECIFICATIONS FOR iPads

| iPad Operating Systems Supported for PARCC Assessments | Platform Specifications for iOS Operating Systems | |
|---|---|---|
| **iOS 10.2+**<br>*Recommended Specification* | No Browser Requirement. The installation of an iPad-specific TestNav App is required.<br><br>**Note:  iPad 2 and iPad 3 do not meet the iOS requirements and will not be supported for Fall or Spring testing.** | |
| **Additional Specifications for iPads** | | |
| | *Minimum Specifications* | *Recommended Specifications* |
| **Memory** | 1GB RAM or greater | 2GB RAM or greater |
| **Processor** | Any processor | Any processor |
| **Connectivity** | Tablets must be able to connect to the Internet via wired or wireless networks. | Tablets must be able to connect to the Internet via wired or wireless networks. |
| **Screen Size** | 9.5-inch screen size or larger[2]/ "10-inch class" tablets or larger | 9.5-inch screen size or larger[2]/ "10-inch class" tablets or larger |
| **Screen Resolution** | 1024 x 768 | 1024 x 768 |
| **Input Device Requirements** | Touchscreen or mouse | Keyboard – wired or wireless/Bluetooth touchscreen or mouse |
| **iPad Accessibility Features** | VoiceOver, Speak Selection, Speak Screen | |

## ANDROID:  PARCC ASSESSMENT SPECIFICATIONS FOR ANDROID TABLETS

| Operating Systems Supported for PARCC Assessments | Platform Specifications for Android Tablets | |
|---|---|---|
| **Android 7.0 Nougat +**<br>*Required Specification* | No Browser Requirement. The installation of an Android-specific TestNav App is required. | |
| **Additional Specifications for Android Tablet** | | |
| | *Minimum Specifications* | *Recommended Specifications* |
| **Memory** | 2GB RAM or greater | 4GB RAM or greater |
| **Processor** | Any processor | Any processor |

| Additional Specifications for Android Tablet | | |
|---|---|---|
| Connectivity | Tablets must be able to connect to the Internet via wired or wireless networks. | Tablets must be able to connect to the Internet via wired or wireless networks. |

| Additional Specifications for Android Tablet | | |
|---|---|---|
| Screen Size | 9.5-inch screen size or larger/ "10-inch class" tablets or larger | 9.5-inch screen size or larger/ "10-inch class" tablets or larger |
| Screen Resolution | 1024 x 768 | 1024 x 768 |
| Input Device Requirements | Mouse, touchpad or touchscreen | Keyboard – wired or wireless/Bluetooth mouse, touchpad or touchscreen |
| Android Tablet Accessibility Features | Text-to-Speech (embedded support varies by device) | |

## BANDWIDTH RECOMMENDATIONS

Minimum bandwidth requirements are based on the maximum level of connectivity needed to administer test content for any one portion of the assessments for Mathematics and ELA/L, recognizing that some sessions may require less than the published minimum bandwidth.  Due to the heavy bandwidth burden of certain test forms and/or accommodations, **proctor caching is very strongly recommended for the administration of the following tests and/or accommodations.**

- ELA/L
- Text-to-speech (Mathematics, ELA/L, and Mathematics Spanish)
- ASL (ELA/L and Mathematics)

**If this content is not cached, it may prevent students from testing.**

In addition, schools with low bandwidth and/or large numbers of simultaneous users, including instructional and other non-assessment uses taking place concurrent with testing, are **strongly encouraged** to utilize proctor caching for all PARCC tests, a strategy that will significantly reduce bandwidth demand for testing.

| External Connection to the Internet | | |
|---|---|---|
| **Minimum With Proctor Caching** | **Minimum Without Proctor Caching** | **Recommended for Assessment + Instruction** |
| 5 kilobits per second (kbps)/student | 50 kilobits per second (kbps)/student | 100 kilobits per second (kbps)/student or faster |

### Minimum Bandwidth - With Proctor Caching

Schools that wish to implement **proctor caching as a low-bandwidth solution for assessment administration should plan to have 5 kilobits per second (kbps) of available bandwidth in their external connection to the Internet for each simultaneous test-taker.** With proctor caching, a school's or district's internal wired or wireless networks will distribute test content to student computers. Local internal network connection speeds may vary based on wireless network configurations or other factors.

Proctor caching software is available to all PARCC schools as part of the Pearson TestNav delivery platform**. PARCC strongly recommends proctor caching to increase the number of simultaneous testers that can be supported and to ensure a seamless test experience.** The Proctor Caching User Guide contains step-by step instructions for using the proctor cache system to increase the number of simultaneous testers that can be supported.

**Minimum Bandwidth - Without Proctor Caching**
Schools that will have students connecting directly to the Internet during test administration should plan to have **50 kilobits per second (kbps) of available bandwidth for each simultaneous test-taker.** The fewer students that are testing at the same time, the lower the bandwidth demand.

**Recommended Bandwidth for Assessment + Instruction**
As schools plan for PARCC assessments concurrently with their efforts to enhance bandwidth capacity that can support technology-rich learning environments, PARCC recognizes that schools are evaluating simultaneous uses of their networks that include instruction, assessment, professional development, and administrative processes. In response, PARCC is modeling the higher recommended bandwidth level of **100 kilobits per second (kbps) of available bandwidth for each simultaneous test-take**r as per the recommendations of the State Educational Technology Directors Association in its May 2012 publication *The Broadband Imperative:  Recommendations to Address K-12 Education Infrastructure Needs* (http://www.setda.org).


## PROCTOR CACHING REQUIREMENTS

Proctor caching is a secure option that will enable schools and districts to deliver interactive computer-based tests even in very limited Internet bandwidth conditions. Proctor caching involves pre-downloading as much of the encrypted test content prior to testing as possible, staging it on a computer (or multiple computers) in a district network location(s), and distributing it to student test-taking computers from the caching server. These procedures will help to avoid potential bottlenecks from testing traffic due to slower network switches, a shared Internet connection, or any other constraint on large-scale assessment traffic.

PARCC's test delivery platform provider, Pearson, is making available to schools and districts a caching option known as "proctor caching" as part of the Pearson TestNav delivery platform. With proctor caching, test content is downloaded only once from the Pearson server to the district or school. Encrypted assessment content resides on a computer within the school network, and is delivered during testing to each student's testing device.  TestNav then decrypts and displays the test content for each student. Only the local network is used for delivering test content while the student is testing to help protect from Internet delays or other networking bottlenecks. School staff should plan on a **minimum bandwidth capacity equivalent to 5 kbps per simultaneous test-taker to implement proctor caching**.

PARCC recommends the following for optimal performance.
- Utilize dedicated computer(s) for proctor caching. Performance may be impacted by multiple services running on the same computer. This is more prevalent on virtual machines.
- To help reduce the risk of network lag, it is recommended that the computer(s) running proctor caching should be located as close as possible on the network to the student testing devices.
- Anti-virus scanning may cause network lag on proctor caching. It is recommended that an anti-virus scanning exemption is allowed on the cache folder.
- Verify that test content from previous testing administrations has been purged from proctor caching computer(s).

| Specifications for Proctor Caching[1] | | |
|---|---|---|
| | *Windows* | *Mac[2]* |
| **Operating System** | <ul><li>Windows Server 2008</li><li>Windows Server 2012</li><li>Windows 7</li><li>Windows 8</li><li>Windows 10</li></ul> | <ul><li>Macintosh OS 10.7</li><li>Macintosh OS 10.8</li><li>Macintosh OS 10.9</li><li>Macintosh OS 10.10</li><li>Macintosh OS 10.11</li></ul> |
| **Memory** | 1GB RAM or greater | 1GB RAM or greater |
| **Disk Space** | 20GB or greater | 20GB or greater |
| **Processor** | 1.6 GHz x86-compatible | Intel Core™ Duo 2.0GHz<br>Only Intel-based Macs are supported |
| **Firewalls, Content, and Spam Filters** | Firewalls, content, and spam filters must be set to allow access to Pearson domains.<br><br>The following must be opened in any firewalls, proxy servers, or software that is used for Internet content filtering:<ul><li>*.testnav.com:80</li><li>*.testnav.com:443</li><li>*.pearsontestcontent.com</li><li>*.thawte.com</li><li>*.usertrust.com *(new)*</li><li>*.comodoca.com *(new)*</li><li>*.google-analytics.com (recommended, but not required)</li></ul><br>In addition, when using proctor caching, you must configure the local area network firewall software and content filters to allow traffic on both of the ports listed below:<ul><li>port 4480</li><li>port 4481</li></ul> | |
| **Additional Guidance** | [1] If you are using firewall software on the proctor caching computer, you must configure the firewall software to open ports 4480 and 4481 for TCP/IP on the local network.<br><br>[2] In certain situations when the parental control is on and the user attempts to connect to SSL sites, the automatic Internet content filter on Mac OS X workstations may block your test delivery domain, for example, testnav.com. To resolve this, set the parental control to "Always Allow" your test delivery domain, for example, testnav.com. | |

## COMPUTER-BASED TOOLS ACCESSIBILITY FEATURES AND EMBEDDED ACCOMMODATIONS AVAILABLE FOR PARCC ASSESSMENTS

The chart on the following page summarizes computer-based tools, accessibility features and embedded accommodations that are supported for the 2017-2018 assessments.

More detailed information about PARCC accessibility features and accommodations, including accommodations for paper-based test forms, can be found in the PARCC Accessibility Features and Accommodations Guidelines, sixth Edition http://avocet.pearson.com/PARCC/Home#10616

| | Windows | Mac | iOS | Chromebook | Android | Linux |
|---|---|---|---|---|---|---|
| **TestNav Tools and Accessibility Features Available for All Students** | | | | | | |
| **Always Available** | | | | | | |
| Flag Items for Review | Yes | Yes | Yes | Yes | Yes | Yes |
| Notepad | Yes | Yes | Yes | Yes | Yes | Yes |
| Line Reader Mask | Yes | Yes | Yes | Yes | Yes | Yes |
| Enlargement Device (Magnifier) | Yes | Yes | Yes | Yes | Yes | Yes |
| Zoom/Magnify[1] | Yes | Yes | Yes | Yes | Yes | Yes |
| **Available at Form/Section-level by Test** | | | | | | |
| Calculator – Scientific | Yes | Yes | Yes | Yes | Yes | Yes |
| Calculator – Five Function w/sq. root | Yes | Yes | Yes | Yes | Yes | Yes |
| Eliminate Answer Choice | Yes | Yes | Yes | Yes | Yes | Yes |
| Text Highlighter Tool | Yes | Yes | Yes | Yes | Yes | Yes |
| Protractor | Yes | Yes | Yes | Yes | Yes | Yes |
| Ruler (Inches/Centimeters) | Yes | Yes | Yes | Yes | Yes | Yes |
| TI Graphing Calculator | Yes | Yes | Yes | Yes | Yes | No |
| **Item/Passage-level Feature** | | | | | | |
| Audio with Volume Control | Yes | Yes | Yes | Yes | Yes | Yes |
| Cut/Copy/Paste (Writing Tools) | Yes | Yes | Yes | Yes | Yes | Yes |
| Exhibits | Yes | Yes | Yes | Yes | Yes | Yes |
| Passage Paging | Yes | Yes | Yes | Yes | Yes | Yes |
| Pop-up Glossary (above grade-level vocab) | Yes | Yes | Yes | Yes | Yes | Yes |
| Spell Check (ELA/L only) | Yes | Yes | Yes | Yes | Yes | Yes |
| Video Playback with Speed Control | Yes | Yes | Yes | Yes | Yes | Yes |

| | Windows | Mac | iOS | Chromebook | Android | Linux |
|---|---|---|---|---|---|---|
| **TestNav Accessibility Features and Accommodations** | | | | | | |
| **Available for Students as Indicated in Personal Needs Profile** | | | | | | |
| **PNP Invoked** | | | | | | |
| Answer Masking | Yes | Yes | Yes | Yes | Yes | Yes |
| Assistive Technology[2,3] | Yes[2] | Yes[2] | Yes[2] | Yes[2] | Yes[2] | Yes[2] |
| Closed Captioning | Yes | Yes | Yes | Yes | Yes | Yes |
| Background/Font Color (Color Contrast) Settings | Yes | Yes | Yes | Yes | Yes | Yes |
| **Refreshable Braille displays (ELA/L only)[4]** | Yes[2] | **No** | **No** | **No** | **No** | **No** |
| Transadaptation of the Mathematics Assessment in Spanish | Yes | Yes | Yes | Yes | Yes | Yes |
| Text-to-Speech[5] (for Mathematics) | Yes | Yes | Yes | Yes | Yes | Yes |
| Text-to-Speech[5] (for ELA/L) | Yes | Yes | Yes | Yes | Yes | Yes |
| Spanish Text-to-Speech[5] (for Mathematics) | Yes | Yes | Yes | Yes | Yes | Yes |
| American Sign Language[5] (ASL) | Yes | Yes | Yes | Yes | Yes | Yes |

[1]Pearson discovered inconsistency among browsers when using browser-based magnification (Safari = 200%, Firefox = 300%, IE = 1000%). Pearson recommends limiting the browser magnification setting to 300% or less.

[2]TestNav is developed according to WCAG 2.0, Level AA standards. Browsers and assistive technologies that comply with the W3C's User Agent Accessibility Guidelines (UAAG) and support WCAG 2.0, Level AA and the ARIA specification form from the W3C should be compatible with TestNav. If the assistive technology used does not support these standards, there may be compatibility issues.

[3]Assistive technology is not supported for use with *TestNav Desktop*. Students using assistive technologies must test with the Firefox 52 Extended Support Release (ESR) 32-bit browser, which is only available on Windows and Mac operating systems, and is found at: http://download.testnav.com/.

[4]Devices used for a Refreshable Braille display also require the use of an Assistive Technology screen reader.

[5]Proctor caching is strongly encouraged. If this content is not cached, it may present challenges for students during testing.