



ASVAB Item Development Process

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PRIOR TO ALL ITEM DEVELOPMENT

- Determine the number of tryout items to be written for each subtest, based on form development goals
- Determine the item difficulty percentage for each subtest (Easy, Medium, Difficult)
- Provide the contractor with the following ASVAB item writing documents:
 - Guide to Item Writing for the ASVAB
 - Sensitivity and Bias Guidelines for the ASVAB
 - Taxonomy structure for each subtest (blueprint) and weights for development

HUMRRO ROLE IN ASVAB ITEM DEVELOPMENT

OVERVIEW

- Recent Volume of Items Developed, Overall and by Subtest
- Project Team
- Steps to Prevent Disclosure of Controlled Items—Test Material
- Item Writer Guidance for Meeting Test Specifications
- Editor Guidance for Meeting Test Specifications
- Workflow

NUMBERS OF ITEMS
DEVELOPED, OVERALL
AND BY SUBTEST,
2017–2022

Subtest	2017-18	2018-19	2019-20	2020-21	2021-22
ARITHMETIC REASONING (AR)	800	800	700	800	700
AUTOMOTIVE INFORMATION (AI)	401	400	300	400	300
ELECTRONICS INFORMATION (EI)	400	400	300	400	300
GENERAL SCIENCE (GS)	800	795	700	800	600
MATHEMATICS KNOWLEDGE (MK)	800	800	800	800	600
MECHANICAL COMPREHENSION (MC)	400	401	300	400	300
PARAGRAPH COMPREHENSION (PC)	800	800	500	800	600
SHOP INFORMATION (SI)	400	401	300	400	300
WORD KNOWLEDGE (WK)	1,600	1,600	1,300	1,600	1,200
TOTAL	6,401	6,397	5,200	6,400	4,900

ASVAB ITEM DEVELOPMENT PROJECT TEAM

Project Director (HumRRO)

- Manages production of tryout-ready items and images for nine ASVAB subtests
- Ensures conformance with security requirements, test specifications, and standard operating procedures
- Manages budget and deliverables

Subtest Teams (HumRRO)

- Each team composed of one to three editors
- Editors for AR, MK, PC, and WK have subject matter expertise in the content of the blueprint
- Editors for GS, AI, EI, MC, and SI rely more on consultants and item references
- **Junior editors:** Manage item writers, conduct initial rounds of copy & content edits
- **Senior editors:** Conduct final rounds of copy & content edits, point of contact for submittals to DTAC

ASVAB ITEM DEVELOPMENT PROJECT TEAM

Graphic Artists (HumRRO)

- Render images in Adobe Illustrator for seven subtests (AI, AR, EI, GS, MC, MK, SI).
- Use templates to comply with ASVAB graphics specifications, provided by DTAC
- Save graphic files in ASVAB Item Bank

Subject-Matter-Expert (SME) Consultants

- **Item writers** (20–40 total SMEs)
 - Number varies based on item quantity needed
 - Develop draft items and images
 - May write for two or more subtests (e.g., AR & MK)
- **Content Reviewers** (4–6 total SMEs)
 - Conduct final review of DTAC-approved items with Adobe Illustrator images
 - May review items for two or more subtests (e.g., MC, GS, & SI)

STEPS TO PREVENT DISCLOSURE OF CONTROLLED ITEMS—TEST MATERIAL

- **Contract's Security/Confidentiality Agreement:** Project team members must sign and comply with the requirements for nondisclosure.
- **ASVAB Item Development Security Agreement:** Project team members must sign and comply with the requirements for keeping secure their access to test specifications and the ASVAB Item Bank. SME item writers agree to submit only original work they author for the ASVAB.
- **Mandatory DoD DHRA contractor training:** Completed by all HumRRO project team members.
- **Secure online ASVAB Item Banks:** For the current task order, item development work for all subtests is conducted in item banks maintained by HumRRO.
 - Unique ASVAB Item Bank for each subtest
 - Multi-factor authentication for access
 - User permissions are restricted to features authorized for role (e.g., item writers can access and edit only the items they draft).

ITEM WRITER GUIDANCE FOR MEETING TEST SPECIFICATIONS

ITEM WRITER GUIDANCE

- Item Writer Tool Kits, unique for each subtest, provide training documents and resources for item writers.
- **Subtest-specific Guidelines for Writing Items include:**
 - Subtest Blueprint (content categories and subcategories)
 - Best Practices for Writing Stems and Answer Choices
 - Targeting Item Difficulty
 - Preventing Bias and Ensuring Fairness
 - Citing Authoritative References
 - Item Writer Checklist
- **Item Acceptance Criteria:** Item must adhere to the guidelines and require only minor to moderate (not major) editing.
- **Sample Items:** Annotated items for each subtest illustrate best practices.

ITEM WRITER GUIDANCE

- Item writers are provided a role-specific ASVAB Item Bank user manual.
 - Item writers can access only their current in-progress draft items.
 - Once accepted by HumRRO editors, the items are no longer accessible to the item writers.
- Item writers for some subtests are given additional subtest-specific guidance.
 - Criteria for including images with items (all subtests but PC and WK)
 - More detailed version of the subtest blueprint (AR, MK, GS, PC)
 - Sample stems targeting each blueprint area (AR, MK, GS, PC, GS, SI)
 - Criteria for providing rationales for answer choices (AR, MK)
 - Best practices for writing PC paragraphs (target length 100–180 words)
 - Criteria for selecting PC paragraphs from the public domain

TARGETING ITEM DIFFICULTY—EXAMPLE: ARITHMETIC REASONING

- Generally, stems (or images) of more difficult AR items will include more of the following features:
 - Ask the examinee to solve a complicated problem
 - Ask the examinee to solve a multi-step problem
 - Include combinations of numbers that are not factors of 2, 5, 10
 - Contain fractions with different denominators
 - Provide the numbers needed to solve the problem in a different order than they are used in the solution
 - Include extraneous information (e.g., one number or measure that is not relevant to solving the problem)
- It is not permissible to combine measures of more than one area of the blueprint in a single item to increase the estimated difficulty level.

PREVENTING BIAS AND ENSURING FAIRNESS—EXAMPLE: PARAGRAPH COMPREHENSION

“The following guidelines are designed to ensure that items are fair for all groups of examinees, despite differences in characteristics including, but not limited to, age, disability status, ethnic group, gender, regional background, native language, race, religion, sexual orientation, and socioeconomic status. Items should not include language that may anger, offend, upset, cause an emotional reaction, or otherwise distract examinees. By following these guidelines, you will help reduce unfair barriers to performance of a diverse group of examinees.”

Example of detailed guidance regarding “Upsetting or Distressing”:

- “Avoid death, pain, extreme hunger, and topics that may raise unsettling personal issues (e.g., common phobias [snakes, spiders]), adoption, slavery or servitude of any kind—historical or otherwise, wanton harm or destruction of anything of value, like artwork, a very old tree, etc.), or topics that are generally sad or depressing. Avoid: activities that break the law, however harmless; shipwrecks, or people enduring extreme or life-threatening conditions; distasteful topics, such as how canker sores develop; colonialism; war; and political conflict.”

ADDITIONAL GUIDANCE: BEST PRACTICES FOR WRITING PARAGRAPHS (PC)

- Reading level of paragraphs
 - Readability (Flesch-Kincaid grade level) ranges from grade three to postsecondary.
 - Most should be written for an average reader, ages 16–18, who is either in high school or has just graduated from high school.
 - Provide context clues for very high-level vocabulary.
 - Avoid terminology/colloquialisms that may pose unneeded difficulty to non-native English speakers.
- Guidance for paragraph topics
 - May be original or an excerpt from the public domain.
 - Should be general, varied, of high-interest level, non-controversial, and not overly technical; they may include expositions, biographies, advertisements, fiction, and editorials.
 - Should avoid living persons, references to copyrighted works, common knowledge (item answerable without reading the passage), potential for datedness, requirement of pre-existing background knowledge, state- or region-specific subjects.

ADDITIONAL GUIDANCE: SOURCES FOR PARAGRAPHS (PC)

- Original work (item writer is the author): May be fiction or nonfiction.
 - No content in an original passage should include verbatim text from another source or be able to be construed as plagiarized.
- Public domain: May be fiction/literary or nonfiction.
 - Content may come directly from written material made in the United States prior to 1926, for which the copyright has expired.
 - Content may be from works prepared by an officer or employee of the United States government as part of that person's official duties (e.g., USDA website).
 - Items with this type of paragraph have an introductory sentence that cites the source and year of publication.

PARAGRAPH
COMPREHENSION:
PERCENTAGE OF STIMULI
SOURCED FROM THE
PUBLIC DOMAIN, BY
BLUEPRINT CODE, BY
YEAR

Blueprint Code	2017-18 (N=800)	2018-19 (N=800)	2019-20 (N=500)	2020-21 (N=800)	2021-22 (N=600)
A1	1.25%	0.63%	1.80%	0.38%	1.00%
A2	1.63%	1.00%	2.20%	1.75%	1.33%
A3	0.50%	0.38%	0.40%	0.88%	0.83%
B1	0.88%	4.13%	2.40%	0.50%	0.67%
B2	2.00%	3.38%	2.00%	0.63%	1.50%
B3	2.13%	1.38%	1.40%	1.13%	0.50%
B4	2.50%	6.50%	10.00%	8.50%	9.00%
B5	2.50%	6.38%	10.20%	7.88%	9.17%
TOTAL	13.39%	23.78%	30.40%	21.65%	24.00%

HUMRRO EDITOR GUIDANCE FOR MEETING TEST SPECIFICATIONS

HUMRRO EDITOR RESOURCES—TEST CONTENT

- **Item Writer Tool Kits**
- **Editor checklists:** Some steps are subtest-specific
- **References, specific to subtest and item content**
 - URL and text from online references supporting the correct response for each item
 - Prior DTAC-approved items
 - Others (e.g., WK and PC use lexicons to help classify item difficulty, EI relies heavily on *Grob's Basic Electronics*, by Mitchel E. Schultz)
- **Style guidance for copy editing**
 - Current edition of *Chicago Manual of Style*
 - Style sheets developed by HumRRO for consistent treatment of special terms and stem formats

HUMRRO WORKFLOW: INITIAL ITEM EDITING

HUMRRO EDITING PROCESSES—JUNIOR EDITORS

- Assign work to SME item writers (set of 10–20 items/assignment).
- Evaluate quality of submitted items relative to criteria for acceptance.
 - Accept or reject each item in the assignment.
 - For rejected items, communicate issues needing repair via the ASVAB Item Bank. Examples of revisions needed:
 - Revise a distractor that is a second correct response.
 - Rewrite the item to target the assigned blueprint category/subcategory.
 - Provide a missing reference.
- Once all items in an assignment are accepted, approve SME item writer invoice.

HUMRRO EDITING PROCESSES—JUNIOR AND SENIOR EDITORS

- SME-written items accepted by HumRRO undergo an iterative editing process.
- Teams of editors use general and subtest-specific guidance to inform revisions to the item content. Examples:
 - Improve clarity of item language
 - Ensure adherence to best practices for multiple-choice items
 - Verify alignment to the targeted blueprint category or subcategory
 - Verify accuracy, using references
 - Avoid bias and sensitive content
 - Screen for suspected duplicate items, per DTAC guidance

HUMRRO EDITING PROCESSES—JUNIOR AND SENIOR EDITORS

- Editors may query SME item writers about potential substantive edits to ensure edits will not alter the item's technical accuracy.
- Revisions to a set of 10–20 items may be needed to meet the specifications for each 100-item series (e.g., distributions of estimates of difficulty, positions of correct responses).
- After edits to a set of 10–20 items are completed, senior editors alert DTAC that the items are ready for initial review and approval in the Item Bank.

DTAC INITIAL REVIEWS

DTAC EDITING PROCESS

- Editors review and edit items for the following:
 - Style
 - Content accuracy
 - Stem clarity (including passages for PC)
 - Absence of clues to the correct answer
 - Appropriate patterns among the distractors
 - Bias and sensitivity
 - Possible enemy items
- Items are approved as is or with edits, or DTAC requests replacement or rewrite.
- DTAC alerts HumRRO's senior editor upon completion of the first review.

HUMRRO WORKFLOW AFTER DTAC'S FIRST REVIEW

AFTER DTAC'S INITIAL REVIEW OF AN ITEM SET

- HumRRO's senior editor
 - Responds to DTAC requests for item revisions
 - Resubmits revised item(s) for re-review and approval
 - Monitors distribution of approved items to ensure subtest specifications are met
- For approved items that contain graphics, the senior editor
 - Coordinates development of Adobe Illustrator images
 - Verifies rendered images match item content and meet graphics specifications
- Once a series of 100 items is approved, the senior editor updates the ASVAB Item Bank to prepare for content review.

INDEPENDENT CONTENT REVIEW

- HumRRO's senior editor
 - Coordinates with an independent SME content reviewer to review DTAC-approved series of 100 items
 - Grants SME content reviewer temporary access to the item series in the Item Bank
- SME content reviewer
 - Verifies item content is factually accurate
 - Confirms artwork is accurate, understandable, and readable—only commonly recognized symbols are used
 - Confirms the indicated choice is the single correct response
 - Recommends revisions and provides rationale and/or cites reference to support revisions

FINAL ITEMS TO DTAC

- Senior editor
 - Reviews and evaluates SME content reviewer's edits and feedback
 - Approves and/or applies edits in response to content reviewer feedback
 - Submits final items and supporting documentation for item series to DTAC
 - Item content, references, and art files stored within the Item Bank for direct access by DTAC
 - Item Bank report file summarizes item count by blueprint area, estimated difficulty level, key position
 - "Must Drop or Revise" list identifies items with post-content review revisions
- DTAC may request SME content review of modified items, identify artwork revisions needed, or accept the final items and artwork as delivered.

SUMMARY

SUMMARY OF ASVAB TRYOUT ITEM REVIEWERS

- At a minimum, each tryout ASVAB item is reviewed by seven to eight pairs of eyes at least once:
 - 1 SME item writer
 - 1 or 2 HumRRO junior editor(s)
 - 1 HumRRO senior editor
 - 3 DTAC editors
 - 1 independent SME content reviewer

Thank you!