



## *From the President*

ASBOG<sup>®</sup> has been tremendously active in 2017 continuing to work on our organizations four major goals: 1) increase attendance and diversity of participants at the Council of Examiners (COE) Workshops; 2) better align ASBOG<sup>®</sup> with other organizations within the geosciences community; 3) increase participation in FG and PG examinations; and 4) continue to improve communications with our Member Boards. In 2017, ASBOG<sup>®</sup> dedicated considerable financial and human resources toward accomplishing these goals. With regard to this last goal, we are excited to roll out this inaugural edition of *A Cross-Sectional View*, a summary of relevant information and key achievements related to the business ASBOG<sup>®</sup>. This pamphlet, which was inspired by the NCEES Squared document, captures statistics related to exam performance and outreach efforts conducted to date. As with a geological cross section, this pamphlet presents a cross sectional slice of the ASBOG<sup>®</sup> organization that illustrates its basis, mission, member boards, and related demographic. Our hope is to produce the pamphlet annually so that our members can easily evaluate the state of licensure and health of the organization.

In closing, I would like to take this opportunity to introduce our newest Member, the New York State Board for Engineering, Land Surveying and Geology. With the addition of the New York Board, the organization has grown to represent 32 Member Boards across the nation. Welcome New York!



Dennis J. Anderson, P.E., P.G.

2017 ASBOG<sup>®</sup> President

## *Statement*

The Mission of the National Association of State Boards of Geology (ASBOG<sup>®</sup>) is to serve as a connective link for the individual state geologic registration licensing boards for the planning and preparation of uniform procedures and the coordination of geologic protective measures for the general public. One of ASBOG<sup>®</sup>'s principal services is to develop standardized written examinations for determining qualifications of applicants seeking licensure as professional geologists. Examination candidates are provided with a copy of the Professional Geologists Candidate Handbook which delineates the format and outline for the examination.

ASBOG<sup>®</sup> administers the Fundamentals of Geology (FG) and Practice of Geology (PG) Examinations twice each year. The FG and PG examinations were developed to evaluate common knowledge and skills related to the practice of geology. The FG examination emphasizes knowledge and skills that are typically emphasized in undergraduate academic programs, and the PG examination emphasizes skills and knowledge acquired and expanded in a practice or job setting. Participating states administer each “closed-book” examination during a

four-hour period. Both examinations are constructed using a four-option multiple choice form, and the FG and PG examinations contain approximately 140 and 110 items, respectively.

Both examinations are based on the results of periodic task analysis surveys (TAS) that are designed to evaluate the current geologic practice. Task analysis surveys have been performed every five years since 1995 by collecting data from a random sampling of licensed geologists from each of the ASBOG<sup>®</sup> member states. The results of all five task analysis studies indicate a high degree of consistency in the practice of Geology throughout the United States and Canada, thereby establishing a sound basis for the development of examinations that are fair to candidates from all regions of the country.

Geologic tasks were rated by both practicing geologists and academicians in terms of the importance of the specific tasks to protection of the public, and the results of the survey were utilized to create test blueprints for both examinations that temporally and geographically reflect the practice of the profession. The eight (8) established Content Domains for the FG and PG Test Blueprints are listed in the Candidate Handbook.

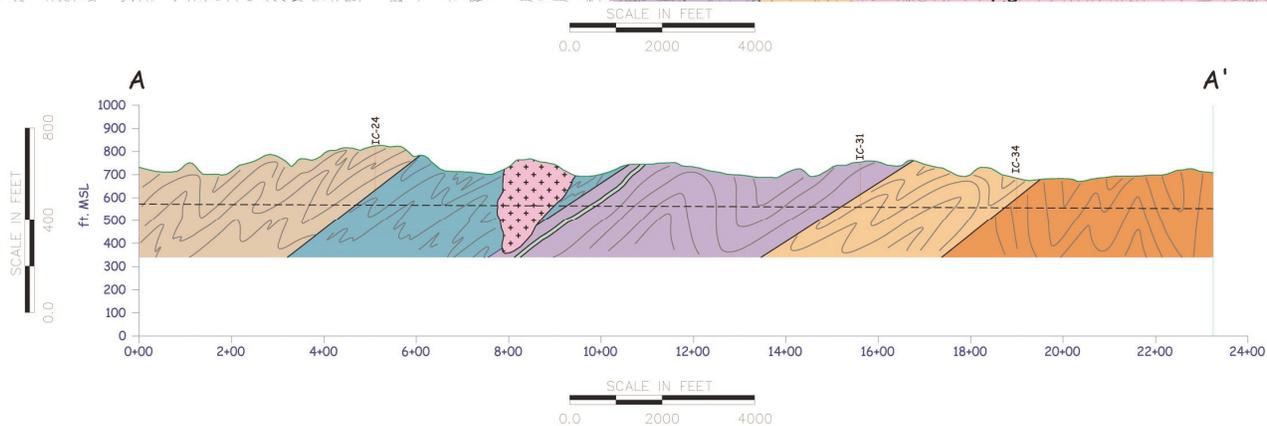
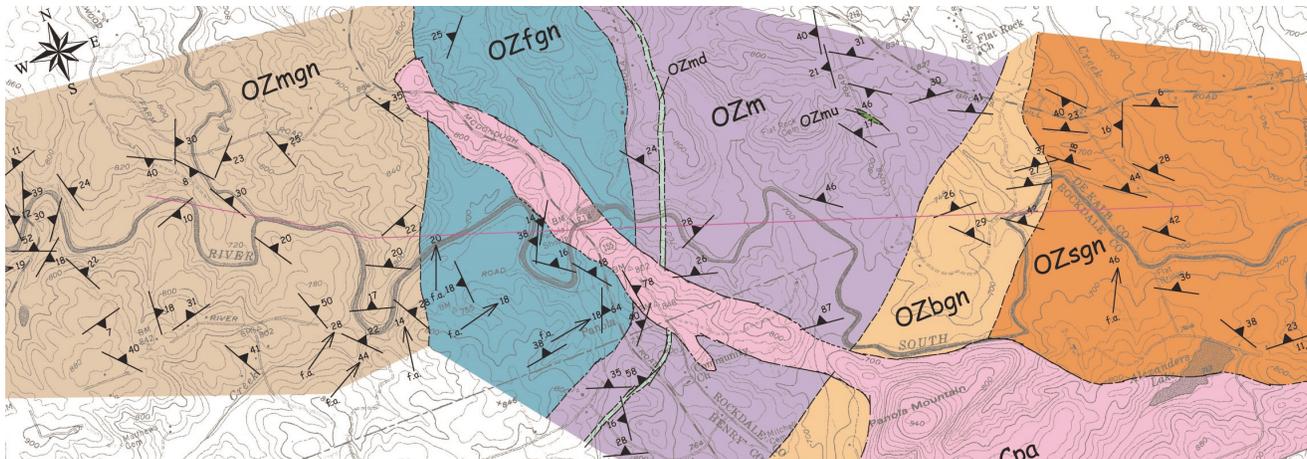
# What is a geologic cross section?

Geological cross section is a graphical representation of a vertical slice through the earth used to clarify or interpret geological relationships with or without accompanying maps.

There are two major classes of cross sections:

- ◆ Structural cross section, shows the present day geometry of an area;
- ◆ Stratigraphic cross section, shows the prior geometric relationships by adjusting the elevation of geological units to some chosen geological horizon.

There are other variations of cross sections, the most common being a balanced cross section (a combination of structural and stratigraphic cross sections), that attempts to portray the form of geological units prior to some episode of structural deformation.



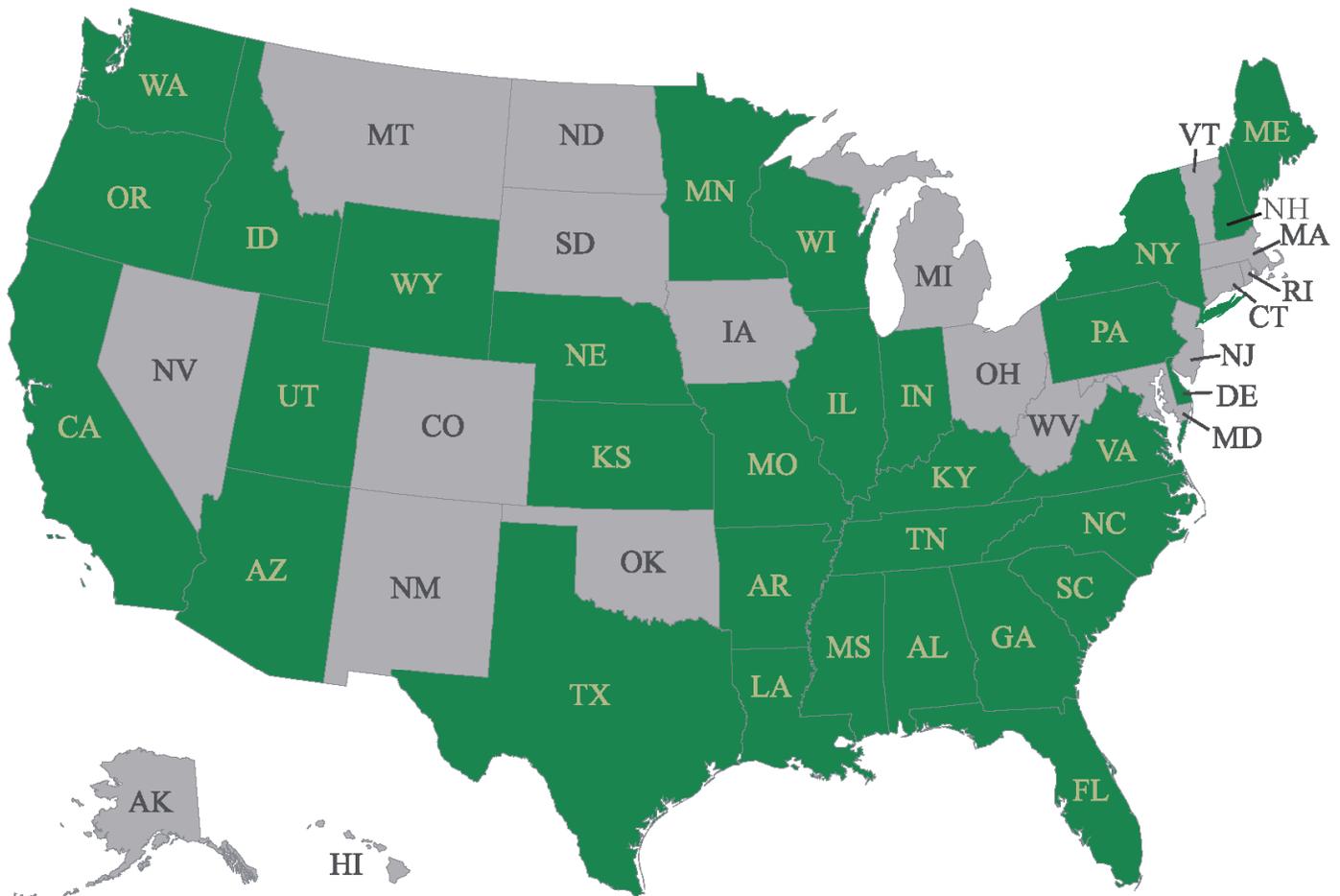
Geologic map and cross section along the South River Tunnel, DeKalb County, Georgia. Courtesy of Dr. Randy Kath, ASBOG® Past President

# ASBOG® | Who we are

The National Association of State Boards of Geology (ASBOG®) is a national nonprofit organization committed to advancing professional licensure for geoscientists.

Professionally licensed geoscientists have met specific qualifications in education, examination, and work experience and are professionally charged to work in a manner that safeguards and protects the public's health, safety, and welfare.

## United States & Puerto Rico



■ ASBOG Member Board Regulatory State (MBR)	(32)
■ Visitor State Regulatory (VSR)	(0)
■ Visitor State Non-Regulatory (VSNR)	(18)



# ASBOG® | What we do

ASBOG® facilitates the mobility for professional geoscientists in the United States by providing services to its member licensing boards including examination development, examination maintenance, and the overall mobility of professional geoscientists. These services include promoting the uniformity of licensure laws across the U.S., in the attempt to facilitate geoscientists to become licensed.

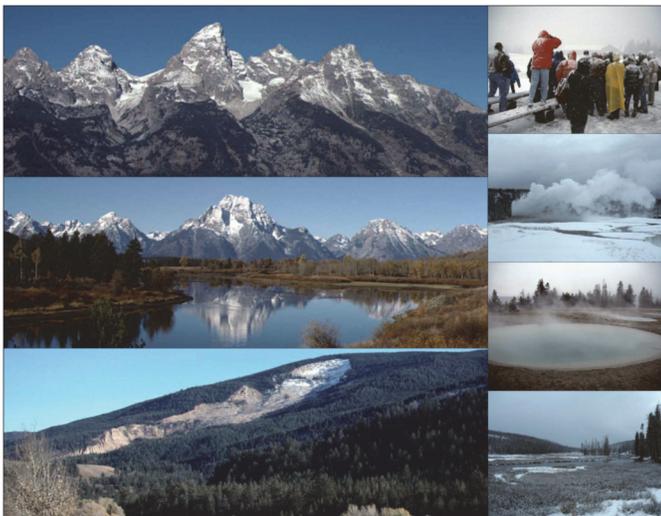
*Council of Examiners (COE) Workshop (2016)*



*Field trip near Knoxville, TN (2013)*



*Field trip in Jackson Hole, WY (1996)*



*SMEs at COE Workshop, Flagstaff, AZ (2017)*



# ASBOG<sup>®</sup> | Examination Development

Through its Council of Examiners (COE) and statisticians, ASBOG<sup>®</sup> has independently created two national geoscience examinations: the Fundamentals of Geology Exam (FG) and the Practice of Geology Exam (PG).

Licensed geoscientists volunteer their time and experience to examination development and maintenance by coming to ASBOG<sup>®</sup> Council of Examiners Workshops to write and evaluate examination questions and answers. In 2016-17 there were nearly 100 Subject Matter Experts (SMEs) hailing from 25 Member States and 2 non-member states that participated in two (2) semi-annual ASBOG<sup>®</sup> Workshops. This represents ~3,200 hours spent developing and evaluating examinations for both of ASBOG<sup>®</sup>'s examinations. In addition to having strong geographic representation, the SMEs bring a diverse set of technical skills that cover each of the eight (8) content domains: A) General and Field Geology; B) Mineralogy, Petrology, and Geochemistry; C) Sedimentology, Stratigraphy, and Paleontology; D) Geomorphology, Surficial Processes, and Quaternary Geology; E) Structure, Tectonics, and Seismology; F) Hydrogeology; G) Engineering Geology; and H) Economic and Resource Geology.

Subject Matter Experts work with a psychometrician to re-evaluate examination and examination question statistics and to select and edit examination questions. Based on results of the COE Workshop, the psychometrician determines final scores for the recently administered national examinations, and adds new questions to the item bank for use in future examinations.

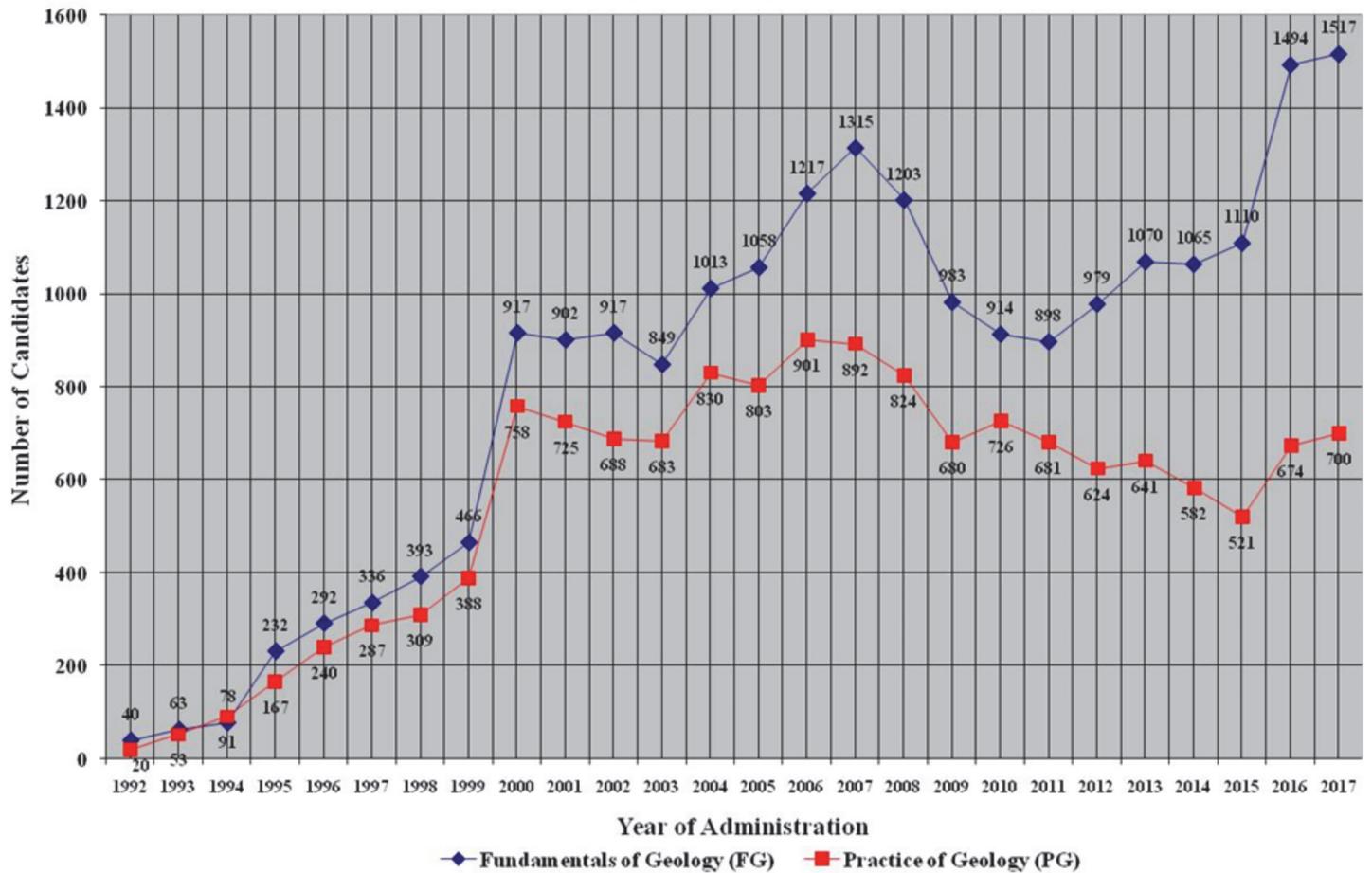
The examinations are administered twice a year– the Spring examination is the 3<sup>rd</sup> Friday of March; the Fall administration is the 1<sup>st</sup> Friday of October.



*National Association of State Boards of Geology*

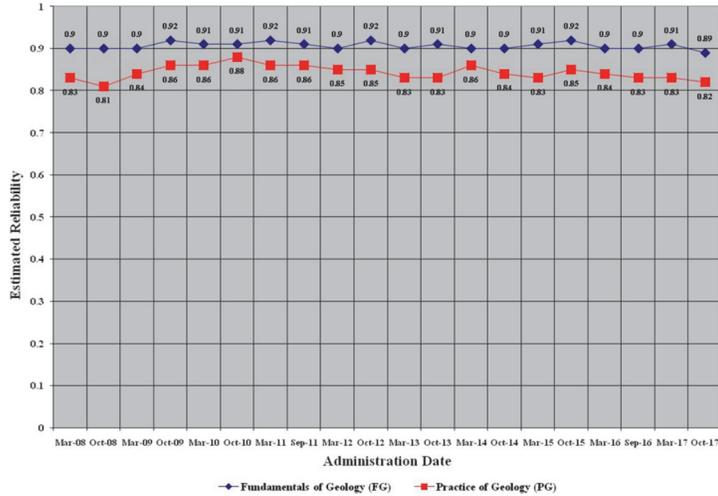
# ASBOG® | Examinations Administered

ASBOG® FG and PG Examinations  
Candidate Volume by Year  
(1992 - 2017)

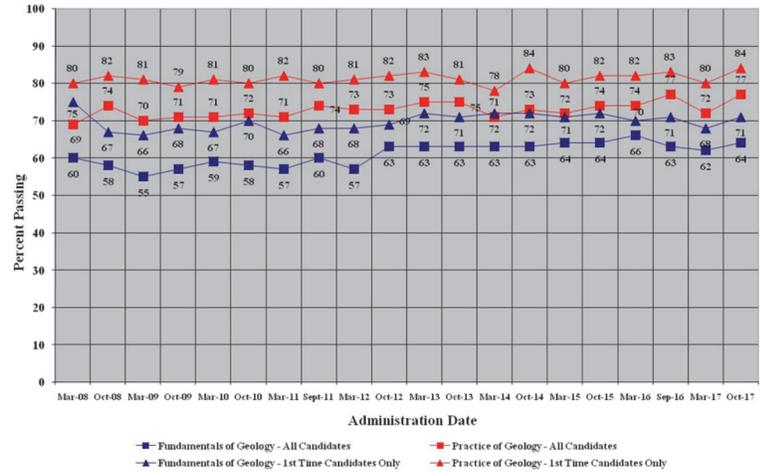


# Examination Performance & Pass Rates

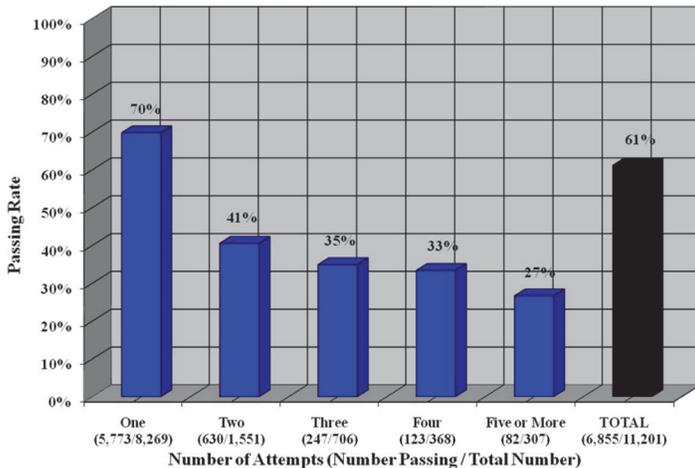
ASBOG® FG and PG Examinations  
Exam Performance by Administration  
(March 2008 - October 2017)



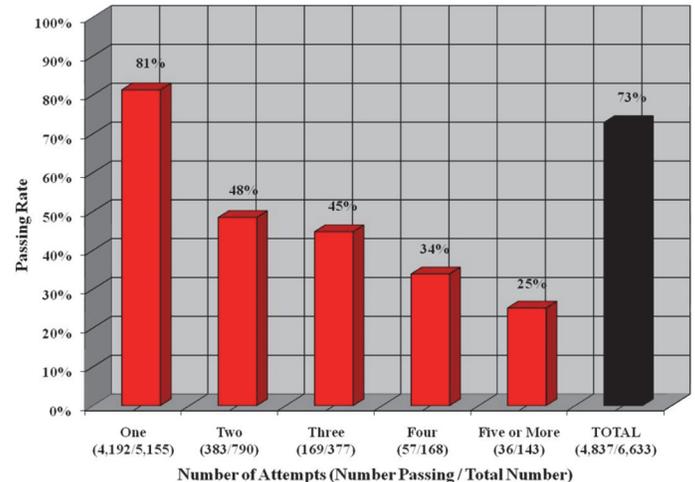
ASBOG® FG and PG Examinations  
Passing Rates by Administration  
1<sup>st</sup> Time Candidates vs. All Candidates  
(March 2008 - October 2017)



ASBOG® Fundamentals of Geology Examination  
Passing Rate by Number of Attempts  
(March 2008 through October 2017)  
Total Number of Candidates = 11,201



ASBOG® Practice of Geology Examination  
Passing Rate by Number of Attempts  
(March 2008 through October 2017)  
Total Number of Candidates = 6,633



# ASBOG<sup>®</sup> | 2016 Candidate Handbook

National Association of State Boards of Geology  
(ASBOG<sup>®</sup>)

PROFESSIONAL GEOLOGISTS  
CANDIDATE HANDBOOK



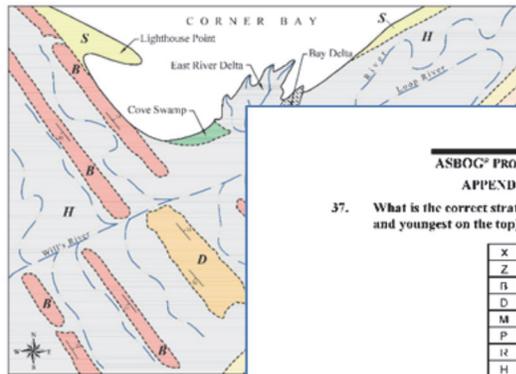
ASBOG<sup>®</sup> is not affiliated with, nor does it provide information for/to preparation course(s), study guide/manuals/aid (i.e. flash cards), or "Professional Geologists Candidate Handbook". This Candidate Handbook is prepared for the ASBOG<sup>®</sup> National Geology Examinations. ASBOG<sup>®</sup> has no affiliation with any commercial enterprise.



(Revised: January 2016)

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ASBOG<sup>®</sup> PROFESSIONAL GEOLOGISTS CANDIDATE HANDBOOK  
APPENDIX 3 - FG Sample Questions and Answer Key



UNIT \_\_\_\_\_ D

- Unit B **Beeswax Sandstone**- (Mississippi) cemented, massive with widely spaced shell hash (elastic limestone) lense
- Unit D **Dogtooth Formation**- interbedded shell hash (elastic limestone) lense
- Unit H **Holiday Formation**- (Miocene to and muds.
- Unit M **Midway Formation**- poorly sorted sandstone, moderately well cemented
- Unit P **Pinkeye Mudstones**- (Jurassic) or coal seams, numerous tree fossils a grades into the Running Ridges Limestone
- Unit R **Running Ridges Limestone**- massive crystalline limestone with upward preserved fossils at the top.
- Unit S **Singing Sands**- well sorted, rounded
- Unit X **X-Ray Granite**- coarse crystalline
- Unit Z **Zebra Complex**- complex pink to contorted bands of mafic (dark) material

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ASBOG<sup>®</sup> PROFESSIONAL GEOLOGISTS CANDIDATE HANDBOOK  
APPENDIX 3 - FG Sample Questions and Answer Key

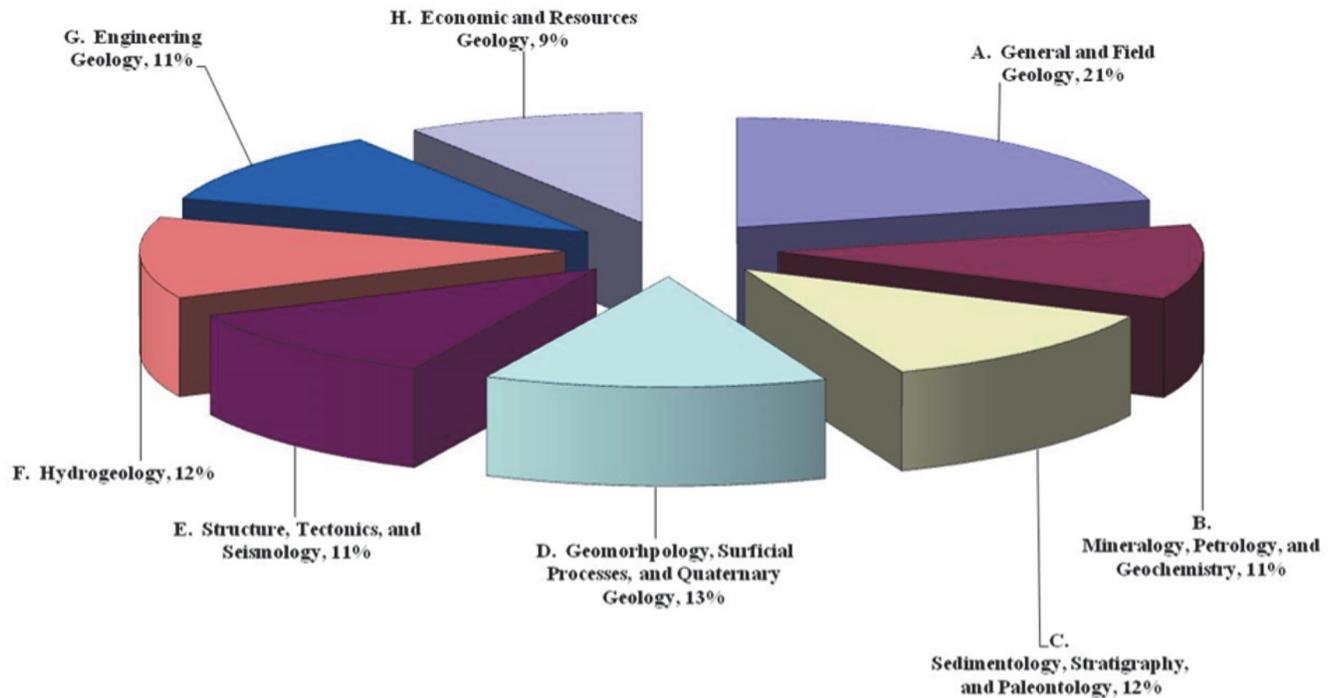
37. What is the correct stratigraphic column for the Corner Bay area (oldest on the bottom and youngest on the top):

X	S	S	H
Z	H	H	S
B	R	R	R
D	P	P	M
M	M	M	I'
P	B	B	B
R	D	D	D
H	Z	X	X
S	X	Z	Z
A	B	C	D

38. Deep exploration holes drilled at the quarry in the X-Ray granite (Unit X) intersected the Running Ridges Limestone (Unit R). Based on this drill hole data, what is the best interpretation of the Unit R-Unit X contact?
- A) normal fault  
B) thrust fault  
C) dextral fault  
D) sinistral fault
39. The contact between the Holiday Formation (Unit H) and the Beeswax Sandstone (Unit B) is a(n):
- A) fault contact  
B) intrusive contact  
C) normal stratigraphic  
D) angular unconformity
40. The quarry located in the X-Ray Granite is a dimension stone quarry. This suggests that the X-Ray Granite
- A) is massive and unfractured  
B) is highly fractured  
C) is deeply weathered  
D) has closely spaced joint sets

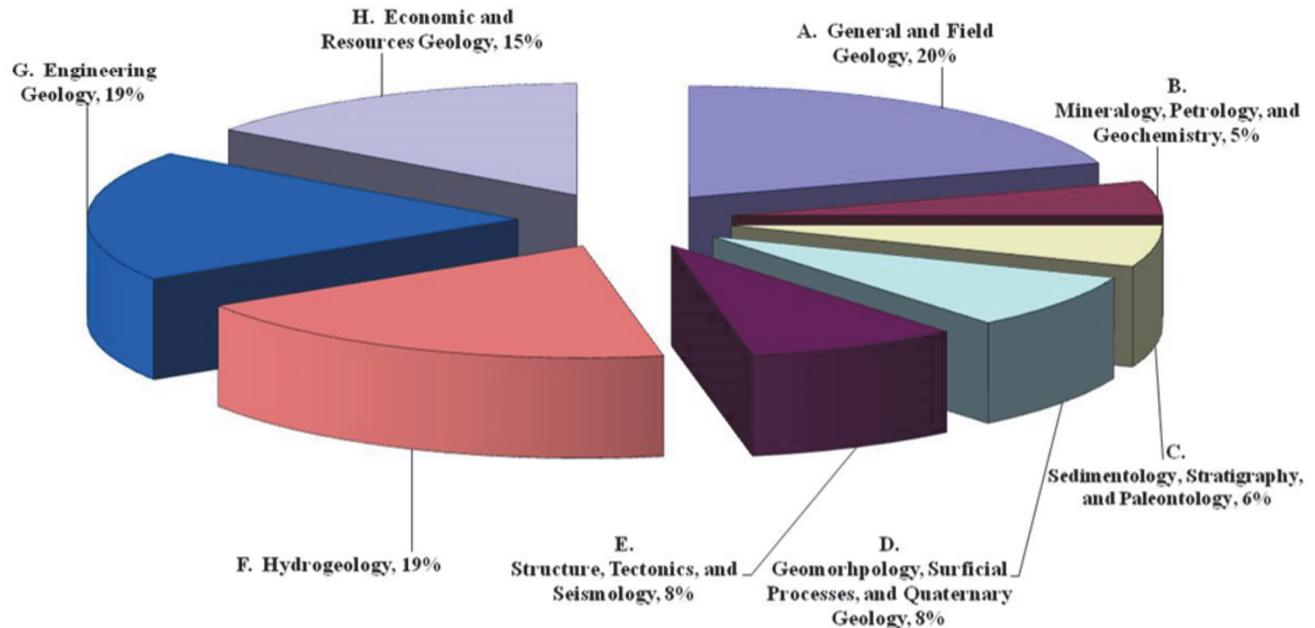
# *The Fundamentals of Geology (FG) Examination*

## ASBOG<sup>®</sup> Task Analysis 2015 FG Test Blueprint - Domain Percentages



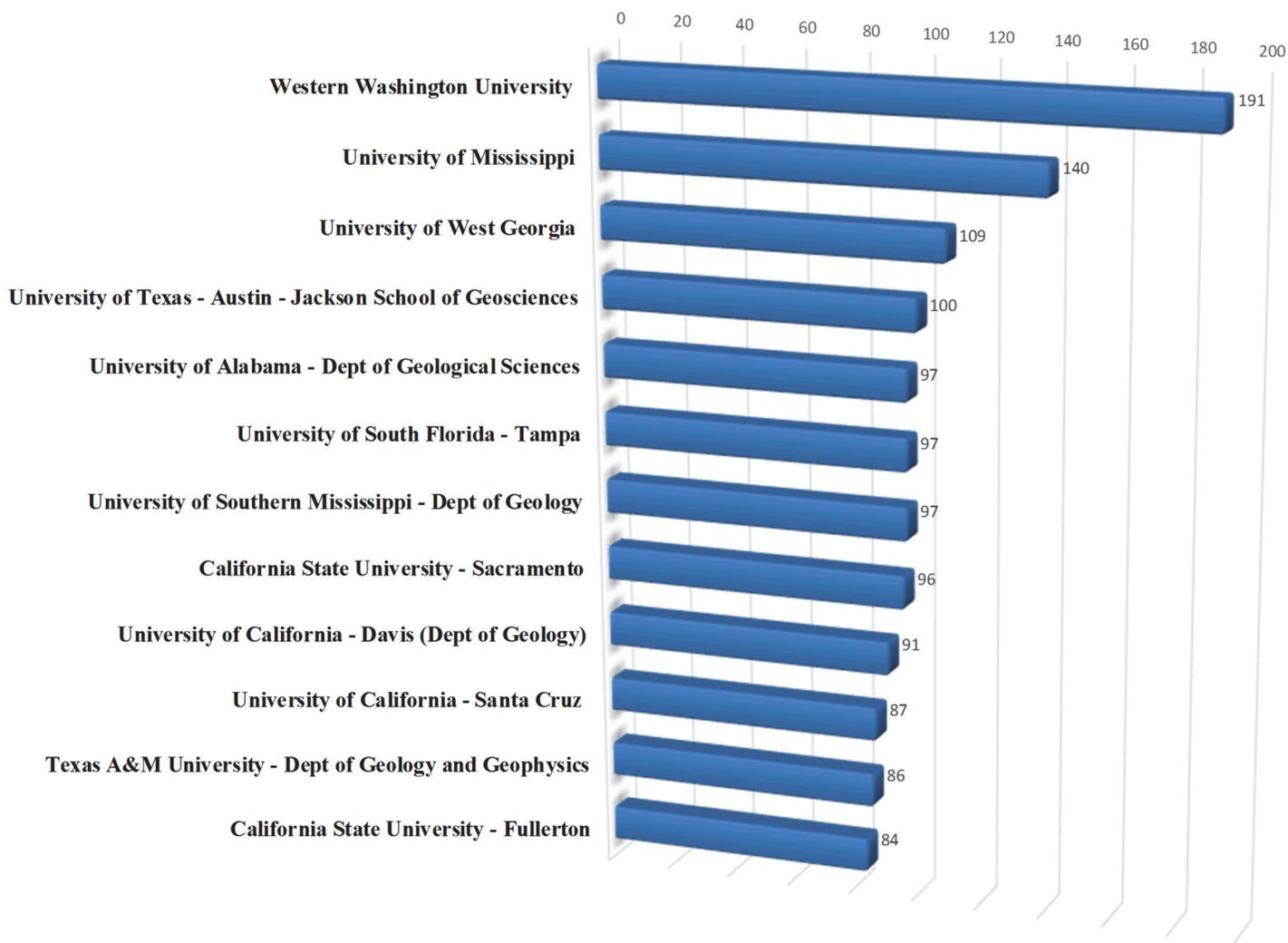
# *The Practice of Geology (PG) Examination*

## ASBOG® Task Analysis 2015 PG Test Blueprint - Domain Percentages



## Top 12 Universities by FG examination volume

Many universities recognize the value of licensure and encourage their students to take the FG during the final semester of their senior year or as soon after graduation as possible.



# ASBOG<sup>®</sup> | Using the FG for Academic Assessment

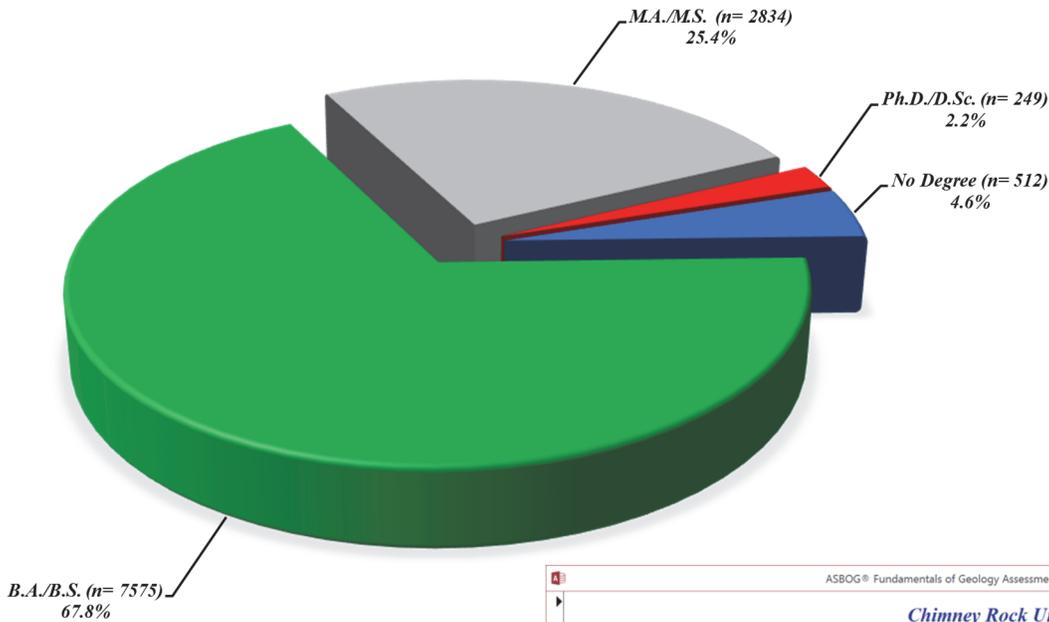
As with other professional licensure testing organizations, the Fundamentals of Geology examination has been utilized as an assessment tool for universities/colleges. Over the past 20 exam administrations, there have been 491 institutions of higher learning whose students have taken the FG examination with the total number of examinees totaling nearly 7,450 over that period. In addition, there now exists a software analysis program (Curriculum Performance Assessment Tool or CPAT) developed by Past President Dr. Randy Kath available to those institutions that want to assess their department and student performance on the FG examination.

There are currently 210 institutions with 10 or more examinations in the CPAT database. This is an increase from 189 institutions with 10 or more examinations from last year. This accounts for the 6,442 records (tests) stored in CPAT. There are many institutions that have 8 or 9 tests and we anticipate that these will be added to the CPAT database when the results from the next administration of the FG examination become available.

The Special Committee on Academic Assessment is an integral part of the Committee on Examinations. The primary objective of Academic Assessment is to support academia through promotion of the Curriculum Performance Assessment Tool for use of the ASBOG<sup>®</sup> FG Examination as an assessment tool, exit examination, and/or graduate school entrance examination. CPAT support has been provided to the following institutions:

- *Arkansas Tech University*
- *Auburn University*
- *Bloomsburg University*
- *California State University- Stanislaus*
- *Central Michigan University*
- *Eastern Kentucky University*
- *Eastern Washington University*
- *East Carolina University*
- *Fort Hayes State University*
- *Georgia State University*
- *James Madison University*
- *Kansas State University*
- *Mississippi State University*
- *Northern Arizona University*
- *Northwest Missouri State*
- *San Francisco State University*
- *San Diego State University*
- *Texas Tech University*
- *University of Arkansas- Little Rock*
- *University of California- Davis*
- *University of California- Santa Cruz*
- *University of Delaware*
- *University of Pittsburgh*
- *University of Pittsburgh- Johnstown*
- *University of West Georgia*
- *University of Wyoming*
- *Utah State University*
- *Virginia Tech University*
- *West Chester University*
- *Western Oregon University*

# ASBOG<sup>®</sup> | Curriculum Performance Assessment Tool (CPAT)



More than 70% of all candidates taking the Fundamentals of Geology examination are graduating seniors (no degree) and/or B.A./B.S. graduates; allowing for the use of this national examination for undergraduate program review, program modification and curriculum assessment.

As an example, Chimney Rock University (fictitious) contains more than 10 examinations in the CPAT database; therefore, it is statistically valid for CPAT to compare the candidates performance on the Fundamentals of Geology examination to the national examination performance.

The main CPAT menu (right) provides summary statistics for the school's performance relative to the national average. Z-Scores, Percentiles, Percent Passing by Degree Year and other data are available.

C  
P  
A  
T

ASBOG<sup>®</sup> Fundamentals of Geology Assessment Graphing Database

### Chimney Rock University

The following graphics provide summary statistics for your schools performance on the Fundamentals of Geology (FG) Examination. These dataset include multiple test attempts by test takers from your school. To view your department's overall summary statistics and performance on the FG exam, select the appropriate graph below:

- Z-Scores for all Data
- Percentiles for all Data
- Scaled Score vs. Number of Attempts
- Scaled Score vs. Percent Correct
- Candidate's Primary Practice vs. ASBOG<sup>®</sup> Domains
- Percent Passing FG by Degree Year
- Percent Correct for all Students
- Average % Correct by year all Content Domains
- Go to Domain-Specific Assessment Analysis

ASBOG<sup>®</sup> National Association of State Boards of Geology

Record: 1 of 1 | No Filter | Search | Form View

# ASBOG<sup>®</sup> | Curriculum Performance Assessment Tool (CPAT)



Z-Scores (left) can be used to show the statistical performance of candidates that are grouped by graduation year. Scores above zero indicate the number of standard deviations above the national mean, whereas scores below zero indicate the number of standard deviations below the national mean.

**Chimney Rock University**

The Fundamentals of Geology Examination is broken down into 8 content (blueprint) domains. This dataset includes multiple test attempts by test takers from your school. To view your department's test takers, first select the area of assessment, then select a test attempt option, then select the highest degree, and then choose from the chart/plot types below:

Select Area of Assessment: **Field and General Geology**

Select Test Attempts:

- First
- First and Second
- First, Second, and Third
- All Attempts

Highest Degree:

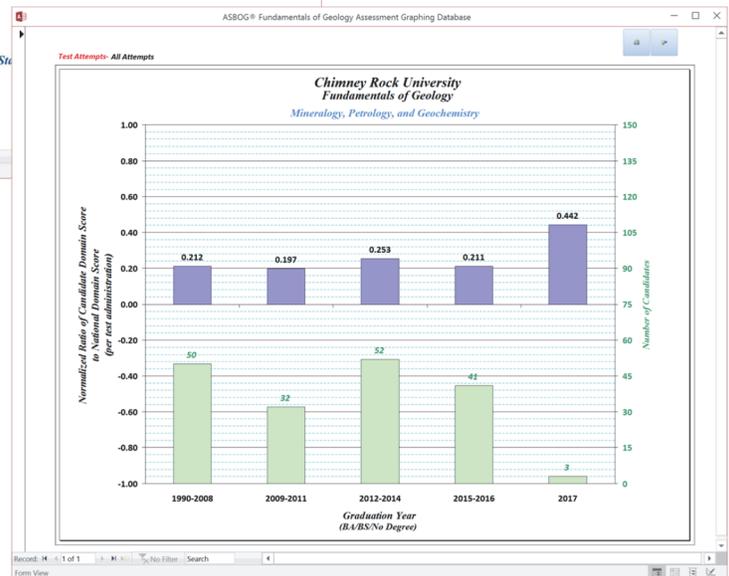
- No Degree
- BA/BS
- MA/MS
- Ph.D.
- No Degree/BA/BS

Available Plot Types:

- Normalized Ratio Score of Selected Domain
- Normalized Ratio Score of Selected Domain w/ n
- Percent Above/Below National Average
- Percent Above/Below National Average w/ n
- Ratio Score Scatter Plot of Selected Domain
- Ratio Score Scatter Plot of Selected Domain w/ n
- Ratio Score Bar Graph of Selected Domain
- Hi-Lo-Mean Graph of Selected Domain

The Fundamentals of Geology examination is broken into eight content domains. CPAT allows for a detailed evaluation of domain-specific performance for a department by using different statistical evaluation plots based on user selected variables (left).

Normalized ratio plots allow comparison of a school's aggregate domain-specific scores relative to the national domain score per test administration (right). These are grouped by graduation year as shown.





*National Association of State Boards of Geology*

*This document was compiled by Rick Ericksen, P.G., ASBOG® Chair of the Committee on Outreach and Uniform Procedures; and edited by Dr. Randy Kath, P.G., ASBOG® Past President and Chair of the Committee on Examinations*