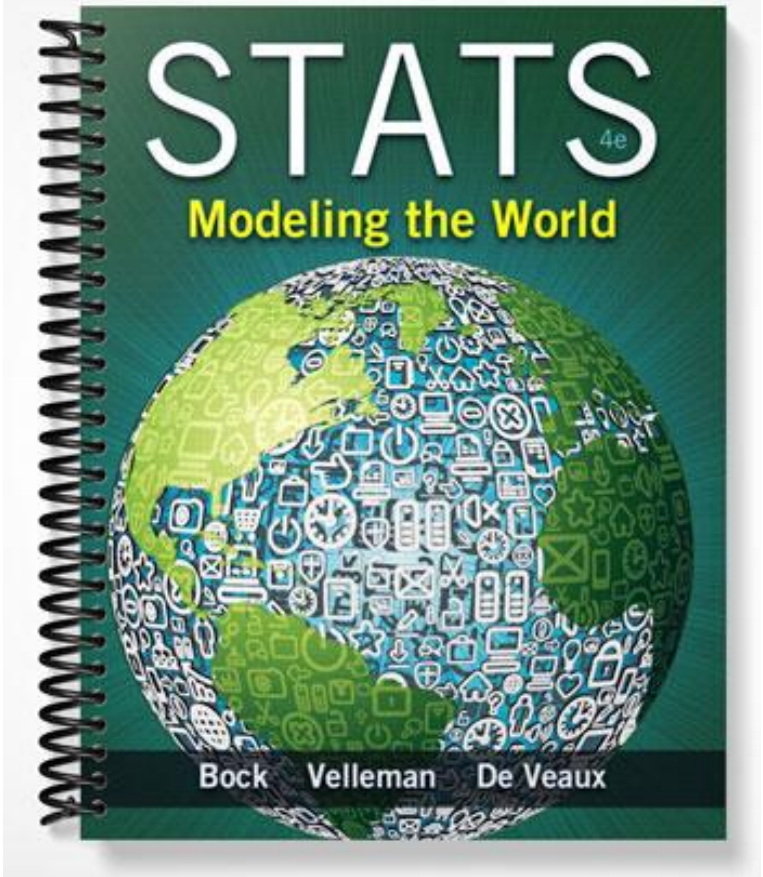
TEST BANK



About This Guide

Whether you are teaching Statistics for the first time, or just adapting to the new approach we take in this book, we hope this Teacher's Guide will help you optimize your students' experience. Here we explain the reasoning behind our approach to teaching Statistics. We summarize each chapter, highlighting the important concepts and pointing out where they'll show up later in the course. We offer some pedagogical suggestions—do's and don'ts—and include examples and activities you might use in teaching your class. We offer suggested quizzes, tests, and investigative tasks. And we provide references to *ActivStats* and other resources that you may find helpful.

Each chapter of this Teacher's Guide contains some or all of the following features.

What's It About?

This section summarizes the major topics included in the chapter. More important, we tell the *story* of the chapter. Each chapter introduces new concepts and methods, and each one fits with what students have learned in previous chapters and will learn in subsequent ones. We give you the overview to help you show your students how it all fits together.

Comments

The Comments section explains the statistical and pedagogical reasons for the choices we've made in what to teach, in how to present it, and in what order to discuss it. Some of these choices may differ from those made by other textbooks. We try to point out these differences and explain our approach.

Looking Ahead

The Looking Ahead sections point out ways that many of the ideas we introduce in early chapters foreshadow or pave the way for important features of later chapters. These are often good points to make in class to motivate students and to help them fit all these new concepts together into a coherent whole.

Class Do's

We offer pedagogical advice about approaches that have worked for us, ideas to stress, and other ways to highlight important concepts or take advantage of important features of this text.

The Importance of What You Don't Say

One of the challenges of teaching AP* Stats is that there's so much to say. But too much information at the wrong time can be confusing to the beginning student. Because deciding how much to say and when to say it can be tricky, we offer some suggestions about what *not* to say and what not to say quite *yet*.

What If…?

You will probably want to expand on the new "What If…?" section in the text. Starting in Chapter 2, we provide several questions that will stimulate class discussions, and get students thinking about the important concepts that will lead to deeper understanding of the major topics of the course, such as independence, sampling variability, the Central Limit Theorem, or statistical significance.

Class Examples

It's always good to have another example for class. Students seem to always want one more example. So we provide new examples different from those in the book or on the *ActivStats* DVD. These can include actual classroom materials in the form of worksheets or guided explorations.

Resources

We offer a list of resources for background information, data sets, and classroom activities. These may include other books, videos, software, or Web sites.

Assignments

We make general suggestions about pace and timing of your work in the chapter, including the amount of reading and the number of exercises you might assign each night.

Chapter Quiz

We offer four versions of a quiz you might choose to give after completing the chapter.

Investigative Task

Instead of a quiz, you may choose to have students complete a written assignment that asks them to apply the major concepts of the chapter. Along with each classroom-tested task we include a scoring rubric you can use as you grade each student's work and return to the student to provide them with guidance about writing clear, complete, concise statistical analyses. (We prefer these to quizzes, but that's us.)

Unit Test

We offer four versions of a sample exam at the end of each of the text's seven Parts (and occasionally more often). These exams, also classroom-tested, include multiple choice questions, short questions requiring some calculations or written explanations, and longer questions requiring more in-depth analysis. They are not easy. When students take the AP* Exam they will be asked to work on difficult problems asking for clear understanding of important concepts, accurate application of statistical techniques, and proper interpretation of the results – all under pressure of time. Many will not finish, but no one is expected to come close to getting everything right. Do not imagine that we think students should succeed on 90% of these questions to earn an A! After all, that's not the expectation on the AP* Exam either.

Also In This Guide

Suggested time lines appear right after this introduction. The full year timeline is based on Dave Bock's experiences at Ithaca High School, where the school year begins right after Labor Day and classes meet 5 days a week for 44 minutes. The alternating block timeline comes from Greg Timm of Roland Park Country School in Baltimore. That school opens right after Labor Day, and classes meet on alternating days for 70 minutes with an additional 40-minute class each week.

A ***Correlation to the AP* Exam*** and an ***Index of Applications*** are included at the end of this guide.

And a word about the Texas Instruments calculators

You'll find the textbook's TI Tips allow students to learn to use the statistics functions for their TI-83+/84+ family of calculators, freeing you from spending valuable classroom time on button-pushing. We prepared those instructions based on the latest TI operating system at the time the text was published, which we urge you to download and install. Occasionally in this Guide we'll provide additional TI Tips supporting calculators with older operating systems. And if your students use TI-89s or TI-Nspire™ handhelds, they'll find calculator instructions in Appendix B's guide to statistical software. Additionally, this Guide directs you to TI-Nspire activities included on the DVD included with the Teacher's Edition of the textbook and available on the book's website, www.pearsonhighered.com/bock.

A Few More Words About the Text

The Preface

We know students won't read the preface, but you should. We think this text is different. We hope to entice students to read the book with our easy-to-understand conversational style—and to entertain them with occasional humor. We have created several features that provide consistent themes and helpful resources for doing Statistics. Take advantage of them!

New to the Fourth Edition

- **Chapter 1 (and beyond)** Now Chapter 1 gets down to business immediately, looking at data rather than just presenting the book's features. And throughout the book we've rewritten many other sections to make them clearer and more interesting. Several chapters lead with new up-to-the-minute motivating examples and follow through with analyses of the data, and many other new examples provide a basis for sample problems and exercises. When compared to previous editions, all other chapters are numbered one number lower than before. Tell your students that the course is shorter than last year!

- **Boxplots** are now introduced in Chapter 3, along with the discussion of the 5-number summary. This is a change from previous editions, where boxplots didn't come along until it was time to compare distributions.

- **What If…?** We close most chapters by looking at a simulation that explores or extends an important concept. Starting with Chapter 1, students see the power of simulation as they gain additional insights or get a sneak preview of important ideas yet to come. These *What If* elements offer great fodder for class discussions while paving the way for better grasp of such critical concepts as independence, sampling variability, the Central Limit Theorem, and statistical significance.

- **Practice Exams** are provided at the end of each Part, right after the Part Review. These exams are have multiple choice and free response sections, providing students with a mini AP* Exam at key points in the course. Practice Exams are comprehensive, providing a series of mini-reviews to keep all the concepts alive.

Continued Features

- **Think-Show-Tell** helps you create the clear expectation that Statistics is so much more than formulas and arithmetic. Every answer is a sentence.
- **TI Tips** free you from downtime in class teaching students how to use the statistical features on their calculators.
- **TI-Nspire Pointers.** Each chapter includes margin pointers to related TI-Nspire demonstrations and activities. You'll find these files on the DVD included with the Teacher's Edition of the textbook. Upload them to your TI-Nspire handheld or computer software, and you are ready to go!
- **Math Box** explanations provide your students more background in the underlying mathematics without detracting from the chapter's narrative.
- **Step-By-Step.** These newly updated examples and solutions further explain and reinforce your expectations of what a complete solution should include by providing your students with fully worked examples and parallel play-by-play commentary to supplement what you do in class.
- **Just Checking** questions help students assess whether they understand the key concepts and skills they're reading about.
- **What Can Go Wrong** helps your students recognize and avoid the common misunderstandings, misapplications, and misinterpretations that can undermine sound Statistics practice.
- **For Example.** In every chapter, you'll find new, worked-out examples that illustrate how to apply the concepts and methods discussed up to that point. With approximately 4 of these examples per chapter, that's more than 100 new illustrative examples. As we introduce each important, new concept, we present a focused example applying it – usually with real up-to-the-minute data. But these aren't isolated examples. We carry the discussion through the chapter with each *For Example*, picking up the story and moving it forward as students learn more about the topics of the chapter. Providing these examples in sequences enhances and illustrates the story of each chapter.
- ***ActivStats*® Pointers** tie the text to corresponding software activities. For the third edition, these pointers have been updated to indicate exactly what they are pointing to – an activity, video, simulation, etc.
- **On the Computer** provides annotated output to help you teach your students how to read the analyses produced by computer software packages.
- **Reality Check** reminds students that Statistics is about understanding the world with data, and that results that make no sense are probably wrong, no matter how carefully we think we did the calculations.
- **Notation Alert** emphasizes the importance of clear communication. Proper notation is part of the vocabulary of Statistics.

- **What Have We Learned** help your students review and study the important concepts, terms, and skills.
- **Exercises** provide you with a generous supply of in-depth and real-world examples requiring the kind of statistical reasoning and clear writing we all hope to foster. Solutions require sentences, not just numbers!

Review of Part …

The 26 chapters of this book are divided into seven units. The end of each Part includes a one page **Quick Review** of the major concepts followed by a large set of **Exercises**. These exercises are comprehensive, often integrate several concepts, and appear in random order. You should find everything you need to prepare your students for tests. We have also provided an opportunity for your students to prepare *themselves* for tests, with an AP*-style Practice Test following the Review Exercises in each Part. Each Practice Test contains both multiple choice and free response questions, just like the AP* Exam.

Some Important Resources

We offer advice on books, videos, software, and other resources we think you'll find helpful.

ActivStats® and Data Desk®

These award-winning programs are on the DVD accompanying the Teacher's Edition. Take time to work your way through the *ActivStats* lessons. You'll learn a lot, and find many activities you'll want your class to see. Activities include narrated and animated expositions, video stories of real-world applications, simulations that support discovery learning, interactive tools, online quizzes, and more. Some work very well as classroom demonstrations; most are interactive lessons you'll want your whole class to engage in. The *ActivStats* pointers in the margins of the text will help you find them, and we'll make chapter-by-chapter recommendations in this Guide. Individual student copies and site licenses are available.

ActivStats is also a source of hundreds of additional exercises, most with data sets provided on the DVD and prepared for use by statistics software. Versions of *ActivStats* are available to support *Data Desk* (on the DVD provided with the textbook), *Excel®, JMP®, Minitab®,* and *SPSS®*. Versions for packages other than *Data Desk* can optionally be bundled with student versions of the software. (Contact Pearson Higher Education for price information.)

TI-Nspire Demonstrations and Activities

Looking for a great way to illustrate an important statistical concept? We've created 29 classroom demonstrations that run on your computer's TI-Nspire software, and included them on the resource DVD that accompanies the Teacher's Edition of the text. These demonstrations were written using Version 1.4 of the TI-Nspire Computer Software – Teacher Edition and will run on the CAS Computer Software. Any updates for these activities will be posted on the book's website, www.pearsonhighered.com/bock.

Note that the TI-Nspire demos are best shown using the software's Normal, Presentation View. (They are not formatted for the handheld units.) Many use the command Control-R on a PC to re-randomize data. The equivalent command on a Mac is Command-R. To rerun the simulations, you can either delete the contents of some of the columns in the spreadsheet or reload the file.

Classroom Activities

- *Activity-Based Statistics*, 2nd Ed., Schaeffer, Gnanadesekan, Watkins, and Witmer; Key College Press, 2004. Here's a great source of excellent classroom activities. We'll cite many in the chapters ahead, and you'll find others that you will want to use.
- *Workshop Statistics: Discovery with Data and the Graphing Calculator*, 3rd Ed., Rossman, Chance, and Von Oehsen; Key Curriculum Press, 2008. Some adopt this workbook style approach as a primary text. We think it's a valuable source of classroom explorations, and will recommend some in particular. Again you are likely to find others you will want to use or adapt.

Videos

- *ActivStats* presents video and animated presentations of real-world applications of Statistics. Some are condensed from the *Decisions Through Data* stories (see below). Others are unique to *ActivStats*.
- *Decisions Through Data*; COMAP, 1992. This set of 5 DVDs contains 21 lessons to show in class. Each looks at real-life situations and demonstrates the use of statistics to answer important questions. The units are typically 10-15 minutes in length, allowing you to show the video segment and have time to discuss the statistical concepts and techniques introduced. We'll indicate appropriate units in many chapters.

Other Books and Magazines

- *Statistics*, 3rd Ed., Freedman, Pisani, and Purvis; Norton, 2001. This book contains interesting stories and great explanations of statistical concepts; it's a valuable resource to have on your shelf.
- *Statistics: Concepts and Controversies,* 6th Ed., Moore; Freeman, 2006. This collection of great stories about the uses and misuses of statistics is a valuable resource when you are looking for examples to talk about in class.
- *Chance*, American Statistical Association. This magazine, published quarterly, provides articles about statistics as well as excellent examples and data sets to use in class.

AP* Review Book

There are several review books on the market, from the usual sources. Our favorite is *Pearson Education AP* Test Prep: Statistics for Stats: Modeling the World,* Fourth Edition, 2015. On one level, that's no surprise, as it was written to accompany this text. However, before this review book came out we used three of the others in our own classrooms. Speaking now as teachers rather than authors, we found our students were best prepared after using this *AP* Test Prep* workbook. It was written by four veteran AP* teachers who have long served as AP* exam Readers. For many years they have seen the mistakes students make on the test, they know the AP* grading criteria well, and all have personal experience structuring review with their own students. It works. The review book can be bundled with the textbooks or purchased separately. For more information, contact your Pearson sales representative.

AP* Central

The AP* Statistics website maintained by the College Board at AP* Central (apcentral.collegeboard.com) is a treasure trove of valuable material. Among other things, after registering you'll be able to:

- *get the latest AP* Statistics course outline;*
- *download questions, solutions, and scoring rubrics for old AP* Exams;*
- *download teaching materials and insightful articles written by other AP* Stats teachers;*
- *read reviews of texts, review books, and other teaching materials;*
- *download unreleased Practice Exams, after passing your course audit.*

The AP* Statistics Listserve

The listserve is a gathering place for people teaching AP* Statistics, and perhaps the gentlest discussion group on the web. Whether you are looking for teaching ideas or have questions about statistical concepts or theory, the response will be quick, varied, and supportive. You'll hear from teachers all over the country with fantastic ideas to share and gain statistical knowledge generously offered by some of the biggest names in the field. This is a must.

- *Sign up at:* apcentral.collegeboard.com
- *Scan the archives:* mathforum.org/kb/forum.jspa?forumID=67
- *Read the FAQ:* mrmathman.com/faq

AP* Statistics Course Audit Syllabus

The College Board requires each teacher submit a syllabus for approval before using the AP* designation in course descriptions and transcripts. Since such a document is quite lengthy, we have provided a sample audit syllabus on the text website, www.pearsonhighered.com/bock. Please be sure that your audit syllabus outlines what will happen in your classroom.

StatCrunch®

StatCrunch is a powerful online tool that allows you to:

- Upload data files from your computer or the Web to you own datasets library.
- Analyze data using the extensive list of numerical and graphical procedures StatCrunch offers.
- Report your insights along with attached data sets and analysis results.
- Share your data, results and reports with the rest of the world or keep them private.
- Comment on your items or those being shared by other subscribers.

Explore and learn more at www.statcrunch.com

Net Links

The Internet is a valuable source of data sets, examples, tables, random numbers, and current events. The good news is that you can probably find almost everything you need or want to know there. The bad news is that the materials will not be consistent or integrated. Be especially wary of introducing students to a variety of online applets, each with its own interface, notation, terminology, and assumptions.

Many of the data sets and examples of the book are sourced from Internet sites. Where appropriate, we provide URL references to the top level, and key search terms to help locate the particular data or discussion. These references may lead to even more up-to-date data than were available when we found them for the book. The data used in the book are available on the DVD, but you may prefer to discuss the most recent versions in class.

We provide below some useful jumping off points, with the obvious caveat that many of them may move, change, or disappear altogether between the time we compile this list and you try to use it. With our apologies in advance when a link fails, we hope you find this effort of value. You'll find information on many other useful links on our website www.pearsonhighered.com/bock.

- Materials posted by other teachers

  courses.ncssm.edu/math/Stat_Inst/Notes.htm

  www.bbn-school.org/us/math/ap_stats/

  exploringdata.net/intro.htm

- Sources of Data

  www.dartmouth.edu/~chance/teaching_aids/data.html

  exploringdata.net/intro.htm

  www.census.gov

  www.fedstats.gov

  lib.stat.cmu.edu/DASL/ (data sets indexed by topic)

  www.madd.org/Drunk-Driving/Drunk-Driving/Statistics.aspx (DWI statistics)

  http://www.fbi.gov/stats-services/crimestats (crime statistics)

  www.amstat.org/publications/jse

  earthtrends.wri.org

- Applets you may find useful for classroom demonstration:

  www.amstat.org/sections/educ/applets.html

  old.stat.duke.edu/sites/java.html

  davidmlane.com/hyperstat/index.html

  www.stat.sc.edu/~west/javahtml

  onlinestatbook.com/stat_sim/

- Software – calculators, commercial software

  education.ti.com

  www.casioeducation.com/home

  www.activstats.com

  www.datadesk.com

  www.minitab.com

  www.jmp.com

  www.spss.com

- Statistics Background

  www.Dartmouth.edu/~chance/index.html

  courses.ncssm.edu/math/Stat_Inst/Notes.htm

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AP* Statistics Full Year TimeLine for *Stats: Modeling the World*

Chapter		Class days
1	Stats Starts Here	2
2	Displaying & Describing Categorical Data	3
3	Displaying and Summarizing Quantitative Data	6
4	Understanding and Comparing Distributions	3
5	The Standard Deviation as Ruler and the Normal Model	5
	Part I – Review and Testing	2
6	Scatterplots, Association, and Correlation	3
7	Linear Regression (including a test)	8
8	Regression Wisdom	4
9	Re-Expressing Data: Get It Straight!	6
	Part II – Review and Testing	2
10	Understanding Randomness	4
11	Sample Surveys	5
12	Experiments and Observational Studies	4
	Part III – Review and Testing	2
	Project (Data Collection and Analysis)	4
13	From Randomness to Probability	3
14	Probability Rules!	4
15	Random Variables	4
16	Probability Models	4
	Part IV – Review and Testing	2
17	Sampling Distribution Models	4
18	Confidence Intervals for Proportions	4
19	Testing Hypotheses about Proportions	2
20	More About Tests	3
21	Comparing Two Proportions	2
	Part V – Review and Testing	2
22	Inferences about Means	3
23	Comparing Means	2
24	Paired Samples and Blocks	2
	Part VI – Group Project, Review, and Testing	4
25	Comparing Counts	6
26	Inferences for Regression	4
	Part VII – Review and Testing	2
	Review for the AP* Exam, with a practice exam	20

AP* Statistics Block TimeLine for *Stats: Modeling the World*

Chapter		Class days
1	Stats Starts Here	1
2	Displaying & Describing Categorical Data	1.5
3	Displaying and Summarizing Quantitative Data	2.5
4	Understanding and Comparing Distributions	2.5
5	The Standard Deviation as Ruler and the Normal Model	2.5
	Part I – Review and Testing	2
6	Scatterplots, Association, and Correlation	1.5
7	Linear Regression (including a test)	5
8	Regression Wisdom	2.5
9	Re-Expressing Data: Get It Straight!	3.5
	Part II – Review and Testing	2
10	Understanding Randomness	2.5
11	Sample Surveys	2.5
12	Experiments and Observational Studies	2.5
	Part III – Review and Testing	2
	Project (Data Collection and Analysis)	2.5
13	From Randomness to Probability	2
14	Probability Rules!	2.5
15	Random Variables	3
16	Probability Models	2
	Part IV – Review and Testing	2
17	Sampling Distribution Models	2
18	Confidence Intervals for Proportions	2.5
19	Testing Hypotheses about Proportions	2
20	More About Tests	2
21	Comparing Two Proportions	1.5
	Part V – Review and Testing	2
22	Inferences about Means	2
23	Comparing Means	1.5
24	Paired Samples and Blocks	2
	Part VI – Group Project, Review, and Testing	3
25	Comparing Counts	2.5
26	Inferences for Regression	2
	Part VII – Review and Testing	2
	Review for the AP* Exam, with a practice exam	6