TEST OF ECONOMIC KNOWLEDGE

EXAMINER'S MANUAL
(Second Edition)

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TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

FOREWORD

The Council for Economic Education (CEE) is proud to introduce the second edition of the *Test of Economic Knowledge (TEK).* Publication of this updated assessment instrument continues the CEE's commitment to providing the highest quality products for teachers to use in their classrooms, to help them give their students the economic tools and skills that are required for every student.

This Examiner's Manual provides the test administrator with information on administering the test and also, because the test has been normed using different norming populations, provides the teacher with information to compare his/her students' performance with that of other similar students across the nation.

Great care was given during this revision of the *TEK* to make the two forms of the test more parallel, both in content coverage and difficulty. Thus, teachers may give students a pre-test and post-test to ascertain their enhanced understanding of economics or they may give half of a class one form of the test and the other half of the class the other, for comparative purposes, with the knowledge that the content and the level of difficulty of the two tests are similar.

Revision of the *TEK* was called for because, although many of the original questions were still relevant and performed well, others were in need of updating. In addition, since the *TEK's* initial publication the CEE developed the *Voluntary National Content Standards in Economics.* It was critical that a primary assessment tool such as the *TEK* be updated to test the content covered in the *Standards.*

The CEE is truly indebted to many individuals who shared their multitudes of talent and precious time to review, revise, and correlate the questions in the *TEK* to the *Standards.* Special thanks go to Bill Walstad, Ken Rebeck, and Roger Butters for undertaking and managing this work. Other economists, economic educators, and teachers (acknowledged by name and institution on pages 1 and 2) with testing expertise reviewed the questions in their various stages of development and contributed to revisions improving the quality of the questions and tests.

Last, but certainly not least, the CEE gratefully acknowledges the generous funding of the United States Department of Education, Office of Innovation and Improvement, Excellence in Economic Education: Advancing K-12 Economic & Financial Education Nationwide grant award U215B050005.

Council for Economic Education

Test of Economic Knowledge: EXAMINER'S MANUAL
(Second Edition)

The *Test of Economic Knowledge* (*TEK*) is designed to measure the economic understanding of students near the end of middle school and at the beginning of high school (eighth and ninth grades). The publication of this second edition of the *TEK* is another step in the process of improving the quality of cognitive achievement measures in economics available nationally through the Council for Economic Education. The *TEK* is one of three nationally normed and standardized economics tests to assess student learning at the pre-college level. Teachers, researchers and other test users now have the *Basic Economics Test* (*BET*) (Walstad, Rebeck and Butters, 2010) for the fifth and sixth grades, the *Test of Economic Knowledge (TEK)* for the eighth and ninth grades, and the *Test of Economic Literacy* (*TEL*) (Walstad and Rebeck, 2001) for the eleventh and twelfth grades. Additional tests for measuring achievement in economics and personal finance at the above grade levels include the *Financial Fitness for Life* tests (*FFFL*) (Walstad and Rebeck, 2005a, b, c).

The purposes of this *Test of Economic Knowledge Examiner's Manual* are threefold. First, it provides test users with a detailed description of the economics content on the test so they are fully informed about test coverage and the rationale for each item. Second, it explains how the test should be administered to students and discusses the possible uses of the test for assessment and instruction. Third, it provides test users with the test results from a national norming with a large sample of students in the eighth and ninth grades so this information can be used to interpret the test scores.

1. TEST DEVELOPMENT

There were several reasons why the *Test of Economic Knowledge* was revised. First, the norming data for the first edition of the *TEK* (Walstad and Soper, 1987) were collected in 1986. Over time, achievement norms become dated and more suspect as indicators of the relative achievement of students. Second, the content validity for the first edition was based on the *Framework for Teaching Economics: The Basic Concepts* (Saunders, et al., 1984). With the replacement of the *Framework* with the *Voluntary National Content Standards in Economics* (CEE, 2010), there was a need to revise the *Test of Economic Knowledge* to align the test with this newer content validity document. Finally, many of the test items were in need of revision to improve clarity, and to improve their usefulness for assessing economic content.

The revision of the *TEK* began in January 2006 and continued through July of 2007. The first part of this work was the preparation of the *TEK* by the test developers and a national committee. The second part of the work was the trial administration of test items and the creation of the version of the revised test that was used for national norming. The third part of the work was collection and analysis of the national norming data and preparation of this examiner's manual.

National Advisory Committee. In January 2006, a National Advisory Committee (NAC) was formed for the *TEK*. The NAC was composed of five members with expertise in teaching, teacher training, and in the development of national tests (see Appendix 1 for a list of the NAC members).

On the NAC were one teacher and one school district supervisor for the social studies, each of whom had extensive training in economic education and experience in developing tests for students at different grade levels: Mark Quintana (Broward County School District, Fort Lauderdale, Florida) and Rebecca Reed (William Wallin School, Colonial School District, New Castle, Delaware).

Also on the NAC were three representatives from the CEE's affiliated centers for economic education. Each of these individuals had extensive experience with CEE materials either by serving as authors of educational materials or as instructors for teacher workshops in economic education. They were William Bosshardt, center director at the Florida Atlantic University Center for Economic Education; Bonnie Meszaros, associate director for the Center for Economic Education and Entrepreneurship, University of Delaware; and Mary Suiter, who at the time this work was done was the director of the Center for Entrepreneurship and Economic Education at the University of Missouri at St. Louis and now works with the St. Louis Federal Reserve Bank.

Two other individuals completed the NAC. Each had participated in the development of national tests in economics. William Walstad, a professor of economics at the University of Nebraska-Lincoln, directed this *TEK* testing project and served as NAC chair. His past test experience includes the preparation of the CEE's *Test of Economic Literacy* (high school), *Basic Economics Test* (elementary school), and *Financial Fitness for Life* tests (grades 3-12). The other test developer serving on the NAC was Ken Rebeck, an associate professor of economics at St. Cloud State University. He had worked with William Walstad on the development of the second edition of the *Test of Economic Literacy* (2001) and on the *Financial Fitness for Life* tests. The CEE representative on the NAC was Elizabeth Webbink, then Vice President for Economics America at the CEE, until Richard MacDonald assumed those duties in late 2006.

The meeting of the NAC was held in January, 2006, in Fort Lauderdale, Florida. Several decisions were made prior to or at that meeting that would affect the shape and content of the new test. First, the test would be designed to assess student understanding of economics at the eighth and ninth grades. The primary focus for test development would be the ninth grade to establish an upper boundary for the test as a measure of student achievement in economics at the end of middle school or beginning of high school. The eighth grade would be included in the testing because it was thought that the test would be a reliable and valid measure for these slightly younger students, who in some cases were completing middle school. It was also decided to conduct some exploratory work with the test using seventh grade students to see how students in the early years of middle school performed on the test, but no firm commitment was made to norm the test with students at this grade level.

Second, the content of questions would be primarily targeted to cover the standards and associated benchmarks as stated in the *National Voluntary Content Standards in Economics* (CEE, 2010) (see Tables 1 and 2 for a list of the 20 standards and Appendix 3 for the full description of each standard). The test items would mostly cover material listed for the grade 8 benchmarks in the standards. This decision meant that some standards (12 and 17) would not be tested because there were only grade 12 benchmarks for these standards. In other cases, a grade 12 benchmark might be used if the content is likely to be taught by ninth grade.

Third, a multiple-choice format would be used for the test so it could more widely sample the extensive content found in the economic benchmarks and standards. There are twenty standards and over a hundred associated benchmarks. It is only possible to ask several questions per standard for the test, which resulted in a broad coverage of the content domain.

Fourth, the *TEK* was designed as an achievement test and not a speed test. A decision was made to limit the test to 40 questions so that it could be completed in about a 40-minute testing period. This period should be within the attention span of most students, even for the youngest group of students taking the test. The test length also fits

into the time allotment of most class periods in schools and would allow ample time for teachers to make arrangements within a classroom for testing, present the test instructions, and administer the test. The content for most questions would not be overly complex so that test items could be easily answered in less than a minute, on average.

Each NAC member was responsible for reviewing the 58 unique items on the first edition of the *TEK* to see if they could still be used or needed revision. Each NAC member also supplied 8–10 new questions for review based on assigned content standards. Some items were added to the pool that came from previous tests (e.g., *TEK* and *FFFL*) and fit the content and grade levels tested. At its January meeting, the NAC reviewed and rated this pool of about 100 *TEK*-appropriate items (previous and new) using five categories: (1) accept as is; (2) accept with minor revision; (3) needs major revision; (4) reject for now, but it might be used after revision if needed; and (5) reject and never use. Test items were assessed at the meeting and approved for possible use, rejected for possible use, or revised as necessary to make them acceptable for test use.

After the meeting, the project director made final revisions to all the acceptable items and arranged them in order by content standard. These revised items were sent to the NAC members for further review and rating using the same five-point scale stated above. Most items were still rated as acceptable for use, but for this review NAC members were also asked to select the items from the pool for each content standard they thought would be best to use for the *TEK* revision.

The project director then compiled all the item ratings and recommendations and used them to select items for his Draft 1 of a field test version. The associate director followed the same procedure and produced his Draft 1. The two directors then met in Sioux Falls, South Dakota, in mid-March 2006 to review their two versions of Draft 1 and make additional changes. Most items underwent further revision. New items were also written and added to each test to fill content holes or to match content coverage across the two test forms. The result from this work was a Draft 2 that consisted of two forms of the *TEK* with 40 unique items on each form.

This Draft 2 was sent to the NAC in late March 2006 for a final review before field testing. The NAC members were asked to rate questions using the same five-point scale stated above. They approved most items for field testing, but did offer suggestions for additional changes to some items. Most of these changes were minor and consisted of changes to the wording of the item stem or to the item alternatives to improve clarity and make sure there was a valid and supportable correct answer as well as three incorrect alternatives for each item.

The project director and associate director then made the changes they thought would work best from the NAC recommendations. They prepared a Draft 3 that again consisted of two forms with each form containing 40 unique items. This Draft 3 was used for the field testing.

Field Testing. Draft 3 of the *TEK* was field-tested in April and May, 2006. About 1,225 students took a printed version of Form A in 55 seventh and eighth grade classrooms in seven middle schools, two sixth grade classrooms, and one twelfth grade classroom. About 1,493 students took a printed version of Form B in 57 seventh and eighth grade classrooms in 12 middle schools, four sixth grade classrooms, and one eleventh grade classroom. The students came from schools located in Broward County, Florida (overseen by Mark Quintana of the NAC), in Palm Beach, Florida (overseen by William Bosshardt of the NAC) and in Delaware (overseen by Rebecca Reed of the NAC). Data collected from teachers indicted that students completed the test in 35 minutes.

The project director then analyzed the data from the field testing and prepared a Draft 4. Test items were retained that showed reasonable difficulty levels and the ability to discriminate between students of greater or lesser understanding of economics. Eight items were discarded that had especially poor item statistics. This Draft 4 was sent to the NAC with suggestions for changes and with a request for any further revisions.

The feedback from the NAC was used to prepare Draft 5. Changes were made to accommodate most of the NAC suggestions. Item statistics from the field testing were also used to determine the placement of items on a particular form so there would be a better balance of item difficulty across the two forms. In addition, an item was moved from one form to the other if it provided clues for answering later questions on a test form. Some item options (A, B, C, or D) were also re-ordered so that option placement for the correct answer appeared about an equal number of times on each form. This Draft 5 was sent to the NAC for final review and it received unanimous approval from the NAC for national norming.

Final Version. The norming version of the test was administered to students as an online test from April 1 to June 15, 2007. After the testing was completed, the test items were reviewed again during the summer of 2007 using the norming data to determine if any further changes needed to be made to any item on each form of the test before it was published by the CEE. A review of the results by the test developers showed each form was producing reliable and valid information on student achievement in economics. Individual test items were also performing well in almost all cases, and item content was sound. As a consequence of the norming analysis, the norming version became the final version.

As will be discussed in the next section (2), there was good coverage of the economic content to establish the content validity of the test. The final version of the *TEK* contains 40 items on each form (A and B). The economics content of items is matched across forms. That is, item 1 on Form A covers the same basic economic content as item 1 on Form B. Items are also ordered so that they move sequentially through economic content. The last two sections (7 and 8) of the manual presents the 40 test items on each *TEK* form and provide the item rationales.

National norms were prepared for this final version based on test data collected from eighth and ninth grade students. Test users can compare the achievement results in economics from their students with those from a national sample of students. These norms are reported in Section 6.

2. THE CONTENT AND STRUCTURE OF THE TEST

The content validity of the *Test of Economic Knowledge* is based on the *Voluntary National Content Standards in Economics* (CEE, 1997). The left sides of Tables 1 and 2 show major economic concepts or topics related to each standard. A complete listing of the 20 standards statements can be found in Appendix 3. The right sides of Tables 1 and 2 show the classification of those *TEK* items that address some aspect of the economics standards.

Several points should be remembered in evaluating the coverage of the test across economics standards in Tables 1 and 2. First, the *TEK* is not designed as a test of each economic standard listed in Tables 1 and 2. There are too few test items per lesson or standard to make a sound judgment about mastery of a particular lesson or standard. It was not feasible for the test to include the number of items needed to assess all the benchmarks associated with each standard.

Second, the classification of a test item by standard is not exact. Some items may fit into more than one standard, or may not be a good fit. The distribution in Tables 1 and 2 reflects the best judgment of the test developers and NAC on the placement of an item.

Third, the distribution of test items reflects the test developers' interpretation of what *ought* to be included in a general test of economics in middle school or lower high school grades based on the national standards in economics. The weights for the test content were determined in consultation with members of the NAC.

Fourth, within each standard there are benchmarks that explain in more detail what economic content should be taught for that standard by grade 4, grade 8, or grade 12. In most cases, the test item focused on the grade 8 benchmarks. For some standards a grade 4 or a grade 12 benchmark was used if the content was valid for economics instruction with eighth or ninth graders (see item rationales in Sections 7 and 8).

TABLE 1. *Voluntary National Standards in Economics:* Content Coverage for *TEK-A*

Standard	Selected Key Concepts*	Items	Total
1.	Scarcity, choice, productive resources	1, 2, 3, 4	4
2.	Decision-making, marginal analysis	5	1
3.	Economic systems & allocation mechanisms	6, 7	2
4.	Economic incentives — prices, wages, profits, etc.	8	1
5.	Voluntary exchange & trade	9, 10	2
6.	Specialization & comparative advantage	11	1
7.	Markets & price	12, 13, 14, 15	4
8.	Supply & demand	16, 17, 18	3
9.	Competition	19, 20	2
10.	Economic institutions	21, 22	2
11.	Money & inflation	23, 24, 36	3
12.	Interest rates	NA	NA
13.	Labor markets & income	25, 26, 27	3
14.	Entrepreneurship	28	1
15.	Physical & human capital investment	29, 30	2
16.	Economic role of government	31, 32, 33	3
17.	Government failure, special interest groups	NA	NA
18.	Output, income, employment, & the price level	34, 35	2
19.	Unemployment & inflation	37, 38	2
20.	Fiscal & monetary policy	39, 40	2
	Total Number of Questions		**40**

Notes: (1) Items 2, 3, 4, 8, 13, 14, 23, 24, 29 and 31 are on both forms of the *TEK*;
(2) *For a complete description of each standard, see Appendix 3;
(3) NA = Standard not applicable to age group tested.

TABLE 2. *Voluntary National Standards in Economics:* Content Coverage for *TEK-B*

Standard	Selected Key Concepts*	Items	Total
1.	Scarcity, choice, productive resources	1, 2, 3, 4	4
2.	Decision-making, marginal analysis	5	1
3.	Economic systems & allocation mechanisms	6, 7	2
4.	Economic incentives — prices, wages, profits, etc.	8	1
5.	Voluntary exchange & trade	9, 10	2
6.	Specialization & comparative advantage	11, 12	2
7.	Markets & price	13, 14, 15	3
8.	Supply & demand	16, 17, 18, 19	4
9.	Competition	20	1
10.	Economic institutions	21, 22	2
11.	Money & inflation	23, 24, 36	3
12.	Interest rates	NA	NA
13.	Labor markets & income	25, 26, 27	3
14.	Entrepreneurship	28	1
15.	Physical & human capital investment	29, 30	2
16.	Economic role of government	31, 32, 33	3
17.	Government failure, special interest groups	NA	NA
18.	Output, income, employment, & the price level	34, 35	2
19.	Unemployment & inflation	37, 38	2
20.	Fiscal & monetary policy	39, 40	2
	Total Number of Questions		**40**

Notes: (1) Items 2, 3, 4, 8, 13, 14, 23, 24, 29 and 31 are on both forms of the *TEK*;
(2) *For a complete description of each standard, see Appendix 3;
(3) NA = Standard not applicable to age group tested.

Cognitive Levels. Test items can also be classified by cognitive level. Although many taxonomies for the cognitive domain have been proposed, the most widely used taxonomy is the one developed by Bloom (1956). This work has six levels: knowledge, comprehension, application, analysis, synthesis, and evaluation. Only the first three levels were used to classify test items for the *TEK*. A description of these cognitive levels is found in Table 3.

TABLE 3. Cognitive Levels for the *TEK*

Level	Emphasis
I Knowledge	recognition and recall — ability to remember facts in a form close to the way they were first presented
II Comprehension	grasp the meaning and intent of information — ability to tell or translate in own words
III Application	use of information — ability to apply learning to new situations and circumstances

One reason for this change is that test experts have found Bloom's *Taxonomy* to be more useful for classifying instructional objectives than it is for classifying test items (Ebel & Frisbie, 1991, pp. 51-52). This problem applies to the *TEK* because cognitive ratings of test items can be arbitrary, especially at the three highest levels — analysis, synthesis, and evaluation. To address this problem, the number of levels was reduced to the first three (knowledge, comprehension and application) because they were the ones most well-defined and justified. *TEK* items that could be classified as analysis or evaluation could be considered application items, so they were placed in the application category in the three-level taxonomy. Educators have found it easier to work with these three levels, or a modification of them, rather than the entire six that were described by Bloom (Davis, 2001, p. 242).

Tables 4 and 5 display the distribution of *TEK* items across the three cognitive levels. On form A, there are six knowledge, 21 comprehension, and 13 application items. On form B, there are seven knowledge, 19 comprehension, and 14 application items. In percentage terms, 15-17.5 percent of all items are knowledge, 47.5-52.5 percent of all items are comprehension, and 32.5-35 percent of all items are application. These results show that the test contains several cognitive levels, but the cognitive specification for each form is weighted at the lower levels of Bloom's *Taxonomy* for this age group.

3. USES OF THE TEST

The *Test of Economic Knowledge* was designed primarily to aid teachers in assessing and improving the quality of the teaching of economics near the end of middle school or the beginning of high school. There are several ways of using it to achieve this objective.

As a Pre-test. The *TEK* can be administered as a pre-test at the outset of a unit of instruction in economics to assess the students' prior knowledge of economic concepts. This use is important to teachers because some school districts now provide instruction in economics sometimes only on a limited basis. If this prior instruction in economics has been effective, many students will have acquired some knowledge of economics. Thus, a teacher will want to know the students' areas of strength and weakness to balance the course's content appropriately.

To make this determination, teachers can compare the scores of their students with the scores for each test item provided in this manual from the national norming data. The manual provides brief rationales for each question (Sections 7 and 8). Teachers might want to examine those rationales before deciding whether the particular concept tested deserves greater attention in the classroom. If still in doubt, the teacher should refer to the *Voluntary National Content Standards in Economics* (see standards

TABLE 4. *TEK:* Cognitive Level Coverage by Standards in Economics for *TEK-A*

Standard	Selected Key Concepts*	I Know-ledge	II Compre-hension	III Appli-cation
1.	Scarcity, choice, productive resources	3	1, 2, 4	
2.	Decision-making, marginal analysis			5
3.	Economic systems & allocation mechanisms		7	6
4.	Economic incentives — prices, wages, profits, etc.			8
5.	Voluntary exchange & trade		9	10
6.	Specialization & comparative advantage			11
7.	Markets & price		12, 15	13, 14
8.	Supply & demand			16,17,18
9.	Competition		20	19
10.	Economic institutions	22	21	
11.	Money & inflation	36	23, 24	
12.	Interest rates	NA	NA	NA
13.	Labor markets & income	25	27	26
14.	Entrepreneurship		28	
15.	Physical & human capital investment		29, 30	
16.	Economic role of government	33	31, 32	
17.	Government failure, special interest groups	NA	NA	NA
18.	Output, income, employment, & the price level	34	35	
19.	Unemployment & inflation		37, 38	
20.	Fiscal & monetary policy		40	39
		15.0 %	**52.5%**	**32.5%**
	Total Number of Questions	**6**	**21**	**13**

Notes: (1) For cognitive levels, I = Knowledge; II = Comprehension; and III = Application (See Table 3);

(2) *For a complete description of each standard, see Appendix 3;

(3) NA = Standard not applicable to the age group tested.

TABLE 5. *TEK:* Cognitive Level Coverage by Standards in Economics for *TEK-B*

Standard	Selected Key Concepts*	I Know-ledge	II Compre-hension	III Appli-cation
1.	Scarcity, choice, productive resources	3	1, 2, 4	
2.	Decision-making, marginal analysis			5
3.	Economic systems & allocation mechanisms	7		6
4.	Economic incentives — prices, wages, profits, etc.			8
5.	Voluntary exchange & trade	10	9	
6.	Specialization & comparative advantage		11	12
7.	Markets & price	15		13, 14
8.	Supply & demand		16	17, 18, 19
9.	Competition	20		
10.	Economic institutions		21, 22	
11.	Money & inflation		23, 24, 36	
12.	Interest rates	NA	NA	NA
13.	Labor markets & income		25	26, 27
14.	Entrepreneurship		28	
15.	Physical & human capital investment		29	30
16.	Economic role of government	32, 33	31	
17.	Government failure, special interest groups	NA	NA	NA
18.	Output, income, employment, & the price level		34, 35	
19.	Unemployment & inflation		37	38
20.	Fiscal & monetary policy		40	39
		17.5%	**47.5%**	**35.0%**
	Total Number of Questions	**7**	**9**	**14**

Notes: (1) For cognitive levels, I = Knowledge; II = Comprehension; and III = Application (See Table 3);

(2) *For a complete description of each standard, see Appendix 3;

(3) NA = Standard not applicable to the age group tested.

and benchmark numbers listed with item rationales in Sections 7 and 8) or lesson materials developed by the CEE (www.councilforeconed.org).

Teachers can group their students' responses by content as shown in Tables 1 and 2. This work will enable the teacher to compare scores on several different standards. Students' incorrect responses often tend to cluster about specific topics; the identification of such topics may lead teachers to give these topics greater emphasis in their instruction. Whether a comparison is made with individual items or broad categories, the *TEK* can be used to discover the areas in which students have strengths and weaknesses before formal teaching begins so that the teacher can make appropriate adjustments in allocating time and emphasis to various topics for which students show relatively limited understanding.

As a Post-test. The *TEK* can be used at the end of a unit of instruction to measure the extent to which understanding has improved. Post-test scores for a given group of students may be compared to their pre-test scores and to the scores for students in the norming sample as presented in Tables 12 and 13. A pre-test and post-test use of the *TEK* should help to provide evidence of the effect of instruction for improving knowledge and understanding of economics during a unit or course of instruction in school.

Such assessment will be particularly useful if the test is administered on both a pre-test and post-test basis to classes in which varying degrees of emphasis are placed on economics and when different teaching approaches are employed. When used in this way, the *TEK* can measure the effects of varying teaching treatments on student performance in economics. Such research of this kind can contribute significantly to the improvement of teaching effectiveness of economics in middle school or lower high school classes.

Researchers employing the *TEK* in experimental and non-experimental settings should pay particular attention to the technical data reported in Section 6 of this manual to make sure that the *TEK* serves as a reliable and valid measure for their specific applications and research needs. For the *TEK* to measure a meaningful change between a pre-test and post-test there needs to be sufficient instruction in economics given to students.

When used as a post-test, the *TEK* should be administered early enough to allow one or two class periods to be used for discussion of test scores and results. The teacher can take advantage of the students' natural interest in their relative standing in the class and in relation to the sample of students who have had previous economics training.

Item Discussion. When students cannot answer a question or find it most difficult to select the correct answer, they are often interested in what the correct answer is and why it is correct. Students' incorrect responses tend to be concentrated on specific topics. It is on those topics that review time can be spent most profitably, since the clustering of errors is an indication of confusion about the topic. The teacher may wish to read the rationale for each correct answer from the Item Rationales (see Sections 7 and 8) or refer students to pages of some lesson materials for teaching economics (see www.councilforeconed.org). Discussion can then continue between students and the teacher, using the test or supplementary materials on economics for further information. The *TEK* can become a powerful teaching tool if used in this way.

Caution should be used in reading or paraphrasing item answers from item rationales, particularly if the test is used on a pre-test and post-test basis. After post-testing, reading the correct response and its rationale should cause no harm and is likely to be effective as a teaching/learning activity. This practice, however, should not be followed after *pre-testing* if a subsequent post-test is to be administered. The reason is that the same items would be used both as a pre-test and a post-test, and students would know the correct answers based on the pre-test discussion of items, thus invalidating a pre-test and post-test comparison.

During a Course. A third use of the *TEK* is to administer one of its forms midway during a course

or unit of instruction and to use the results for *formative* evaluation purposes. Data on student performance near the halfway point can then be used to alter instructional strategies for the balance of the course or unit, thereby more closely reaching the instructional goal — greater student understanding of economics.

It should be remembered if all or parts of the *TEK* are administered during a course and also as a post-test, it is likely that some student "learning" will result because students will then answer a test item twice. Students may "remember" items from one test administration to the next, thus making any comparison invalid.

Research. The first edition of the *TEK* led to a number of evaluative studies and research on the teaching of economic concepts in middle and high school grades. The authors hope that revision of the *Test of Economic Knowledge* will result in renewed interest in economic education research and evaluation in grades 8 and 9.

4. ADMINISTERING THE TEST

The *Test of Economic Knowledge* was designed for teachers or administrators to use with middle school or lower high school classes taking units in economics. It is also possible to use this test in units that do not directly cover economics (e.g., history) because the test covers concepts that would typically be taught in many courses. The decision, however, about whether the *TEK* should be used to measure student achievement in these other units should be based on a careful review of test items and course content.

Those individuals who administer the *TEK* should be familiar with the test procedures that are described below. Specific directions for the students are provided in the student test booklet. Although these instructions will be adequate for most situations, it is suggested that the examiner carefully look over the test and the answer sheet to anticipate any problems before the testing session begins. Unless standard procedures are followed when the *TEK* is given to middle school or lower high school students, the results obtained at different times may not be strictly comparable with those published in this manual. For most uses, the *TEK* should be easy to administer and it may be scored by hand or machine.

Materials. The *TEK* booklets are reusable, provided students follow instructions and do not write in them. After each testing session, you should inspect the booklets for pencil marks. Either erase any marks completely before using the booklets again or discard them.

The test questions may be answered on a facsimile of the blank answer sheet provided in Appendix 3, or on a machine-readable answer sheet having at least 40 answer positions, each with at least four options. If answers are to be machine scored, the teacher must use answer sheets that are compatible with the scoring equipment to be used, and the students must mark the answer sheets with the appropriate pencils (usually No. 2 lead). In any event, students should be cautioned not to use a ballpoint pen. Use of a pen will make it difficult to change responses and most machines will not score ballpoint markers. For machine scoring, it is advised to have additional pencils of the appropriate type on hand.

The room in which the test is to be administered should be well lighted, well ventilated, and quiet. The students should have sufficient working space to accommodate both the test booklet and answer sheet. Students should be seated so as to minimize opportunities to see each other's answers (unless a group-testing method is used), or alternative forms of the test can be given to students.

All test materials should be counted and assembled prior to the testing session. Placing an answer sheet under the front cover of every test booklet so that both answer sheet and test booklet can be distributed together saves testing time. Students should each receive only one booklet.

Timing the Test. The *TEK* requires about 40 minutes of testing time for students in middle school or lower high school grades, depending on

the group. If testing is done in a class period that is shorter than 40 minutes, and the time cannot be extended, allowance should be made for this factor when test scores are evaluated and compared to the published test results.

The *TEK* was designed as a power test of economics achievement rather than as a speed test, so it is probable that most students will complete it in less than 40 minutes. If students change classes and there are set class periods, the testing should begin as soon as possible after the start of class and 40 minutes of class time should be allowed for the testing. To ensure that students do not arrive late, it may be helpful to remind them in the class prior to the test to try hard to be on time and to bring No. 2 pencils.

Directions for the Examiner. If the test booklets and answer sheets are passed out together (with No. 2 pencils if necessary), instruct those taking the test to fill in the requested information on the answer sheet before opening the test booklet. If the test booklets and answer sheets are not passed out together, distribute the booklets while the students are filling out the preliminary information on the answer sheet. In either case, test booklets should remain face up and closed until the examiner gives the signal to begin.

When everyone has received all the necessary materials, say:

Read the directions to yourselves as I read them aloud:

1. Please fill out the information requested on the answer sheet before beginning your test.
2. Do not write in this booklet or make other marks in it unless your teacher tells you to do so.
3. When marking your answer sheet, use *only* a regular No. 2 pencil. DO NOT USE A PEN. Do not make any stray marks on the answer sheet. If you make a mistake, erase completely the answer you wish to change.
4. This test is designed to measure your understanding of economics. Not all students who take this test will have taken a separate unit in economics, but most have learned something about the subject in their other courses, through reading newspapers, listening to the radio, watching television, browsing the Internet, or from some other source. These questions will measure how well you understand the basic economic ideas and their applications.
5. The *TEK* has 40 questions. After you complete each question you should move to the next one. Continue this work until you complete all questions. After you are finished you can return to questions to check or complete any answers.
6. You should try to answer *every* question by marking what you think is the best choice. You might not know the answers to some questions, but use the information you *do* have to eliminate those choices you think are incorrect and select your best answer. Work at a comfortable speed, but do not spend too much time on any one item. The test consists of 40 questions or incomplete statements, for which you should choose the **one best answer**. With some items more than one answer may appear to be correct, but your task is to choose the *best* answer.

After reading the directions say:

"The sample question on the front cover of the test booklet gives an example of a properly marked answer. Notice that response D has been completely filled in. When you begin the test, read each question carefully and choose your answer. Then use your pencil to blacken the lettered space *on the answer sheet* that corresponds to the letter of the answer you have chosen."

If the answer sheet will be machine scored, say:

"The test will be scored by machine, so be sure that you use only a No. 2 pencil to mark your answers on your answer sheet. Fill in the space

under the letter that corresponds to the letter of the answer you have chosen. Be certain to make each mark heavy and black. If you change an answer, be sure to erase your first mark completely before making another mark. Erase all stray marks on your answer sheet."

Whether the sheets are to be scored by hand or by machine, say:

"When you finish the test, go back and check your answers. If you have any questions, raise your hand now. I cannot answer *any* questions about the test content after it has begun. However, if your pencil breaks or if you find you have a faulty booklet or answer sheet, raise your hand."

When you have answered all questions, say:

"You will have 40 minutes for the test. Remember: Make no marks on the test booklet itself. All right. Begin."

During the first minutes of the test, check to see if the students are marking their answer sheets properly. When testing is completed, collect all materials. Verify that all materials have been collected before students leave the room.

5. SCORING THE TEST

The score for the *Test of Economic Knowledge* is the number of correct responses. The maximum possible score is 40. A single answer sheet should be used, and this sheet may be scored by hand or by machine.

Each question on the *TEK* has four choices: one correct answer and three distractors. Chance would dictate an aggregate correct score of 25 percent (about 10 points on the *TEK*) for those who had no knowledge of economics. If some students score below 25 percent on the test, their answer sheets in particular should be carefully checked for systematic errors in test marking, scoring, or test administration. For instance, the key for Form A might have been used inadvertently to score a Form B test. Such a low score may also mean that a student has not taken the test seriously and is just randomly supplying answers, so check such test forms to make sure that the test was taken seriously by the student. It may be necessary to omit that test form from the analysis of the test data.

To score the test by hand, use the key and facsimiles of the answer sheets in Appendix 4. Scan each answer sheet to be sure the student marked only one answer for each question; if more than one answer was marked, the response to that question is considered wrong. To use the scoring key, punch out the blackened circles and place the key over the answer sheet. The raw score is the total number of answer marks showing through the holes minus any multiple-marked items.

After the tests have been graded and returned to the students, the teacher can read each test item aloud (as the students read silently from their test booklets and take note of their responses), asking those who answered correctly to raise their hands. The number of correct responses divided by the number of students taking the test and multiplied by 100 is the class percentage correct for that item. Such activity may lead to additional discussion of the economic content and provide an opportunity for a teacher to clarify or reinforce the reasons for a correct answer to a test question.

Most schools are equipped to machine score tests. In such cases, a special answer sheet is required that is compatible with the available scoring machine. Usually, No. 2 pencils *must* be used to mark answers. If machine scoring will be used, check with the scoring service in advance about required answer sheets and pencils.

Machine scoring of tests often produces a printout of the student roster with raw scores and percentiles for the scores by group tested. The group mean, standard deviation, and a frequency distribution are often provided. Such data can be useful in the interpretation of results. The results can be compared against the national norms shown in Tables 6-13.

6. TECHNICAL DATA

Norm Testing

To conduct the national norming, a testing website was created. The reason for collecting the data online was to make the testing process more efficient and to permit easier access for all teachers. A survey of members of the NAC determined that most schools had ready access to computers for such online testing and that teachers would prefer this method of testing so they could obtain fast feedback on the results.

The construction of the website at the University of Nebraska-Lincoln (UNL) was done under the direction of Roger Butters, an assistant professor of economics and president of the Nebraska Council on Economic Education. He worked in conjunction with the information technology staff in the UNL College of Business Administration to establish the website, put the questions online, and monitor website use by teachers.

Several steps were required to obtain the norming data via the website. First, a teacher recruitment letter was sent to the national network of directors of state councils and centers for economic education and other individuals working in economic education. The letter explained the purpose of the testing and requested that they help by sending the e-mail with the website link to teachers and school administrators in the relevant grades. Second, teachers interested in participating in the national norming went to the website and registered with their names and school addresses. They were also asked the number of classes and number of students in each class who would be tested and whether students had been taught economics. Teachers did not have to teach economics to have their students participate. Third, the teacher-supplied information was reviewed by Roger Butters to eliminate any odd or extraneous signups, or to obtain more complete information. Fourth, once approved, teachers returned to the website and created class groups by completing a classroom questionnaire and declaring the number of students in each class. Teachers were then able to download spreadsheets containing unique access codes for each student in each class. Access codes were assigned to students by teachers to protect student anonymity. Fifth, teachers took the students to a computer lab or used classroom computers for the testing. Students were given instructions from the teacher, logged into the website with their student codes, and then completed the test.

Potential issues also had to be considered with the online testing. To minimize any problems with the computer testing, teachers were given detailed instructions about how to conduct it in several e-mail communications as well as online instructions and updates on the website. Teachers also were able to contact Roger Butters to provide advice on how to handle any testing problems.

To reduce the potential for cheating, teachers were asked to proctor students during testing. Students within each class were randomly assigned by the computer server to take either form of the test. Question order for each student was determined randomly, questions were displayed individually, and students were unable to revisit a test question once an answer was submitted. Randomization of test forms and question order made it difficult for students to compare or see each other's answers. Another advantage of this randomization of test forms was that it produced about equal sample sizes of students taking each form of the test within each class.

Testing time was another concern. The specified time period for the test was 40 minutes, and students were told that time limit. To allow for possible problems with website logins or computers, a general decision was made to set the computer-allowed testing time for up to two hours once a student began taking a test. After the two-hour period, the computer server logged out the test as incomplete and these test data were considered invalid. This timing concern did not turn out to be a problem because in almost all cases, students completed the test within the specified 40 minutes (mean time was 17 minutes).

Student Sample

The period for teachers to access the website for testing was near the end of the 2006-2007 school year, from April 1 to June 15, 2007. A total of 6,856 students participated in the testing (3,518 on form A and 3,338 on form B). Not all these data, however, could be used for the national norming because some of the data were outside the final target of the eighth and ninth grades for testing. That restriction eliminated 691 students who were enrolled either in the fourth through sixth grades or in the tenth through twelfth grades.

In addition, it was originally thought by the NAC that seventh grade students could be included in the testing to provide a wider range of grade levels, so the testing invitation included this grade level. After the norming analysis, a decision was made to omit the seventh grade from the manual, and this change eliminated another 2,213 cases (1,022 for form A and 1,191 for form B). The reasons for this decision were several. The norming results showed that the overall test was quite difficult for most seventh grade students (43-44 percent correct, on average). Also, the differences in test and item scores between those students with and without economics were small or negative — most likely because of the limited amount of economics instruction in most seventh grade classrooms. The results for the seventh grade were not considered to be sufficiently reliable and valid to report for norming purposes.

The final norming sample for the second edition of the *Test of Economic Knowledge* consisted of 3,752 eighth and ninth grade students (1,921 form A and 1,831 form B). Of this group, 1,634 were in ninth grade (828 form A and 806 form B). Another 2,118 students were enrolled in eighth grade (1,093 form A and 1,025 form B).

The test data were collected using the 141 schools listed in Appendix 2. The final sample for norming included 233 classes, taught by 84 teachers in 25 states. The approach taken in conducting the norming was to invite a large group of teachers to participate who would test a broad and diverse group of students from different types of communities, different regions, and different sizes of schools. The composition of the students would also vary by gender, race, and ethnicity.

These data were collected from students, teachers, and schools, so that information was available for judging the characteristics of the *TEK* sample and the test results. The data are subdivided into categories by gender, grade level, school size, student/teacher ratio, the composition of schools by race (percent black), ethnicity (percent Hispanic), estimate of poverty level (percent free lunch), type of community, and region. A case can be made that the norming sample contains a broad and diverse distribution of students. Data supplied later in this section reports the test scores broken down across these subsample characteristics (see Tables 14 and 15).

No claim is made that the group tested is *exactly* representative of the student population enrolled in the eighth and ninth grades in schools throughout the nation. It was not possible to obtain a stratified, random sample of students in these grades. The test data, however, are probably indicative of the general results that would be obtained if a teacher provided substantive economics instruction to students and compared those results to students without such instruction. The particular results from each school, however, are likely to vary based on the above characteristics and other factors that can affect test scores.

Table 6 reports the aggregate statistics obtained from the 3,752 students who took the test. These results are shown by test form (A or B) and by type of instruction (with or without economics). Overall, the means for the two forms of the test are roughly equivalent (difference = 0.64 points) and the standard deviations are essentially the same. These similarities also hold for those students with and without instruction. In addition, the alpha estimate of reliability and the standard errors of measurement are the same on both forms of each test. (The meaning of these two terms will be discussed later in this section.)

TABLE 6. Aggregate Statistics for *TEK* Norming Sample

	Form A	Form B
Sample Size		
Number of Students	1,921	1,831
Percent with Economics	36	36
Reliability		
Coefficient alpha	.86	.85
Standard error of measurement	2.85	2.85
Means		
Overall	20.69	20.05
[A = 1,921; B = 1,831]	(7.65)	(7.33)
With Economics	23.59	23.20
[A = 513; B = 483]	(7.91)	(7.68)
Without Economics	19.64	18.92
[A = 1,408; B = 1,348]	(7.24)	(6.85)

Notes: (1) Sample sizes are in brackets.
(2) Standard deviations are in parentheses.

Tables of Norms

The purpose of collecting the norming data was to make the test scores as meaningful as possible. The test data in this manual provides national norms against which test users may compare the scores of their students. In addition, statistical data obtained from the norming data were used both to judge the technical adequacy of this edition of the *TEK* and to make the two forms of the test as equivalent as possible.

The norming data should not be considered as indicating the absolute standard of achievement in economics in the eighth and ninth grades. Rather, the norms provide a relative standard. They are an aid to teachers in comparing their students with others. The comparisons will be meaningful to the extent that composition of the student body in any class is similar to the norming sample.

Tables 7 and 8 present the raw test scores and corresponding percentile ranks based on the test data obtained from the norming sample of eighth and ninth grade students. The percentile ranks were obtained by calculating the total percentage of students in a given grade who scored at or below a certain raw score. These tables permit the conversion of raw scores to percentile ranks according to whether students have had prior instruction in economics or not. The *with economics* norms show the results for those students taking a unit of instruction in economics. The *without economics* norms show the results from the sample of students who reported that they had no prior economics instruction.

Percentile ranks allow comparisons to be made among students in different groups. For example, a student who completes a course in economics and obtains a raw score of 25 on Form A of the *TEK* has a percentile rank of 55. A raw score of 25 on Form A for a student who has no prior economics instruction would be the equivalent of a percentile rank of 76. Therefore, a student with an economics course and a raw score of 25 on Form A is performing as well as, or better than, 76 percent of students with the same score without prior economics instruction.

Equivalence of Test Forms

The test forms are parallel in content structure. Each item on Form A covers essentially the same content as each item on Form B. This parallel structure in content contributes to the equivalence of the two test forms. In addition, the inclusion of 10 common items that were the same on both *TEK* forms contributes to the equivalence of scores between the two forms (see Table 6). These common items are distributed across the test in six of the content standards. These common items were 2, 3, 4, 8, 13, 14, 23, 24, 29, and 31. They represent 25 percent of each test.

Several empirical methods can be used to equate the raw scores on the two forms of the *TEK*. The methods produce somewhat different conversions, so test users will have to decide which one to use for their purposes. A case can be made for either equating method. For each method, the changes in a raw score from Form A to a scale on Form B will be relatively minor given the similarity in scores by test form.

TABLE 7. Percentile Norms: *TEK-A*

(Grades 8-9)

Raw Score	With Economics *(n = 531)*	Without Economics *(n = 1,408)*	Overall *(n = 1,921)*
40			
39			
38			
37	99		
36	97		99
35	96	99	98
34	92	98	97
33	89	98	96
32	86	96	94
31	83	94	91
30	78	92	88
29	73	90	86
28	68	87	82
27	63	84	78
26	59	80	75
25	55	76	70
24	51	73	69
23	46	68	62
22	43	64	59
21	39	59	54
20	36	56	50
19	32	51	46
18	29	46	42
17	26	42	38
16	22	37	33
15	19	33	29
14	16	28	25
13	13	22	20
12	10	18	16
11	8	14	13
10	5	10	9
9	3	7	6
8	3	5	4
7	2	3	3
6	1	2	2
5		2	1
4		1	1
3		1	1
2		1	
1			

TABLE 8. Percentile Norms: *TEK-B*

(Grades 8-9)

Raw Score	With Economics *(n = 483)*	Without Economics *(n = 1,348)*	Overall *(n = 1,831)*
40			
39			
38			
37			
36	99		
35	98		99
34	96	99	98
33	94	98	97
32	89	98	96
31	85	97	94
30	81	96	92
29	76	93	89
28	70	91	86
27	65	89	82
26	61	85	79
25	56	82	75
24	51	78	71
23	46	74	67
22	42	69	62
21	39	64	58
20	36	59	53
19	32	53	48
18	29	48	43
17	26	44	39
16	22	38	33
15	20	33	30
14	17	29	26
13	14	24	21
12	11	19	17
11	8	14	13
10	6	11	9
9	4	8	7
8	3	6	5
7	3	4	4
6	2	2	2
5	1	2	2
4		1	1
3		1	1
2			
1		1	1

Equipercentiles. Using the equipercentile method, a score on Form A and a score on Form B may be viewed as equivalent if the corresponding percentile ranks of any given group are equal (Angoff, 1984, p. 86). Tables 7 and 8 show that a score of 26 on Form A is associated with the 75th percentile of overall scores. The 75th percentile on Form B would be associated with a score of 25. Thus, a score of 26 on Form A is equivalent to a score of 25 on Form B based on an equipercentile comparison test score.

Following a similar procedure with all scores yields a table for the conversion of raw scores on Form A to scores on a scale for Form B (Table 9). The results show slight differences in a raw score on Form A and its equivalent on Form B. This outcome was expected because there was great similarity in the norming samples of Forms A and B. The test development process also was designed to make the two tests as parallel as possible. Items were often written so they would be a matched pair covering the same content.

TABLE 9. Equivalent Scores of *TEK* Forms A and B Norming Sample

Score on		*Score on*	
A	**B**	**A**	**B**
40	40	20	19
39	39	19	19
38	38	18	18
37	37	17	17
36	35	16	16
35	34	15	15
34	33	14	14
33	32	13	13
32	31	12	12
31	30	11	11
30	29	10	10
29	28	9	9
28	27	8	8
27	26	7	7
26	25	6	6
25	24	5	5
24	23	4	4
23	22	3	3
22	21	2	2
21	20	1	1

Linear equating. A more precise method for equating uses a formula to transform the raw scores on one test to a scale on another test (Angoff, 1984, pp. 94-97). In essence, the sample of students tested on Form A and Form B are two random halves because students were randomly administered Form A or Form B within their classes. Given this randomization, the means and standard deviations for each form of the test (Table 6) can be used to produce an equation that converts the raw scores on Form A to the scale of Form B: $B^* = (Sb/Sa)(A) + [Mb - (Sb/Sa)(Ma)]$, where B^* is the raw score of A transformed to the B scale, A is the raw score on A, Ma and Mb are the respective test means, and Sa and Sb are the respective test standard deviations.

For students with economics instruction, the equation is: $B^* = .971\ (A) + 0.291$. Using this formula, a score of 20 on Form A would be equivalent to a score of 19.71 on the scale for Form B, which when rounded produces a score of 20. For students without economics, the equation is: $B^* = .941\ (A) + 0.437$. For the total group of students, the equation is: $B^* = .991\ (A) - 0.047$.

Item Analysis

Test administrators may want to know how their students performed on certain items of the *TEK*. This information would be important in cases where the teacher covered only some of the concepts included in the test. Information on item difficulty and discrimination will help teachers evaluate student performance on particular items.

Item Difficulty. Tables 10 and 11 show the percentage of correct responses for each item for students with and without economics — or item difficulty. This percentage is an estimate of the difficulty of an item for a particular group of students. Theoretically, this percentage can range from 0 to 100 percent, but most items will fall in the 30 to 80 percent correct range for those students with economics instruction. Students without economics instruction will generally have a lower percentage correct for each item.

TABLE 10. Item Discrimination and Percentage of Correct Responses: *TEK-A*

Grades 8-9

Item	Correct Answer	Corrected Item — Total Correlation (*n = 1,921*)	Percent Correct With Economics (*n = 513*)	Percent Correct Without Economics (*n = 1,408*)
1	D	.53	59.5	39.2
2†	C	.33	59.3	43.4
3†	C	.22	52.4	26.7
4†	D	.42	72.1	65.1
5	B	.40	63.6	51.6
6	A	.31	49.7	45.1
7	B	.37	51.3	40.5
8†	C	.45	81.3	73.2
9	A	.35	67.1	62.4
10	B	.38	67.1	59.5
11	B	.21	45.4	39.1
12	B	.26	53.8	43.7
13†	A	.44	81.9	75.4
14†	B	.44	78.0	71.0
15	D	.25	34.9	31.8
16	D	.47	62.0	57.1
17	A	.35	50.5	47.9
18	A	.28	57.1	53.1
19	B	.41	68.0	54.1
20	A	.35	68.8	58.4
21	D	.42	61.2	46.4
22	C	.24	51.7	46.6
23†	A	.29	49.9	43.0
24†	D	.37	64.1	55.2
25	D	.47	71.0	58.8
26	C	.16	48.7	49.9
27	C	.39	61.8	53.0
28	B	.33	86.4	79.6
29†	D	.43	61.6	51.6
30	C	.33	37.0	24.2
31†	D	.33	65.9	57.5
32	B	.22	38.4	21.2
33	D	.44	55.4	42.3
34	C	.23	53.8	36.8
35	A	.23	52.6	48.3
36	C	.36	62.6	45.1
37	B	.25	58.1	54.7
38	C	.33	49.7	41.1
39	A	.40	47.4	39.6
40	A	.23	57.9	30.7

Note: (1) †item on both forms

TABLE 11. Item Discrimination and Percentage of Correct Responses: *TEK-B*

Grades 8-9

Item	Correct Answer	Corrected Item — Total Correlation (*n = 1,831*)	Percent Correct With Economics (*n = 483*)	Percent Correct Without Economics (*n = 1,348*)
1	B	.34	65.0	52.4
2†	C	.32	56.5	41.7
3†	C	.19	53.8	28.0
4†	D	.40	71.6	64.7
5	C	.11	43.7	42.0
6	B	.29	52.0	40.4
7	A	.37	68.3	54.2
8†	C	.42	78.3	71.3
9	A	.37	71.2	65.9
10	B	.33	68.7	59.4
11	C	.26	48.2	37.1
12	A	.44	70.6	57.6
13†	A	.46	83.6	73.4
14†	B	.44	79.3	70.5
15	D	.33	46.4	33.7
16	B	.32	64.0	40.4
17	A	.30	65.0	57.8
18	D	.20	33.5	33.7
19	D	.45	50.9	39.0
20	C	.33	71.6	48.2
21	C	.34	66.9	52.1
22	D	.27	40.4	42.4
23†	A	.25	44.5	40.4
24†	D	.35	61.5	54.3
25	D	.40	46.8	39.1
26	C	.31	46.2	30.3
27	B	.38	85.1	80.9
28	A	.34	53.2	39.8
29†	D	.46	64.8	51.0
30	D	.19	20.5	19.7
31†	D	.36	67.1	56.2
32	B	.23	42.9	39.0
33	A	.32	65.2	56.3
34	C	.29	53.0	37.3
35	A	.42	62.1	50.4
36	C	.37	66.3	45.5
37	A	.28	38.9	37.0
38	B	.23	50.9	31.0
39	B	.21	26.5	35.8
40	B	.29	52.0	65.6

Note: (1) †item on both forms

Data on item difficulty should be interpreted with care. Item difficulty (percentage of correct responses) depends on many things besides the complexity of the fact, concept, or principle being tested. Such matters as classroom emphasis on the specific point in question, the closeness or plausibility of incorrect alternatives or "distractors" and the relation of the item content to students' outside activities, experiences, reading, and awareness may also affect item difficulty. It is worth emphasizing, therefore, that undue attention should not be placed on small differences between the percentage reported in this manual and those obtained in the classroom.

In a few cases, the percentages correct for those students with economics are slightly lower than the percentages correct for students without economics. This statement applies to item 26 on Form A and items 18, 22, and 39 on Form B. In these few cases, the item percentage correct for each group is about the same. From a content perspective, there are no problems with these items, at least in the opinion of the NAC and the test developers. What may be occurring in these cases is that students may not have been taught much about that economic concept or idea, and therefore the item percentage correct for those students with and without economics will be about the same. Before attaching too much weight to the item results or to judge an item, it is important to know whether an economic concept or idea has been taught to students.

Item Discrimination. Also reported in Tables 10 and 11 is a discrimination coefficient for each *TEK* item. It is the corrected item-to-total score correlation or point-biserial correlation. The coefficient measures the correlation between the students' total test scores (less the particular item) and their scores on a particular item. It is an assessment of the functioning of that item with the students who were tested.

This correlation coefficient ranges from 0 to 1. The *higher* the value of the coefficient, the better the item functions as a discriminator between those students who know more or know less economics. If this coefficient is zero, it would indicate that this item fails to discriminate between those with more and less knowledge of economics as measured by their total score.

In general, if an item has a discrimination coefficient below 0.20, the item may either be a weak discriminator or it may indicate that there is limited classroom coverage of the tested concept. The latter concern probably applies to item 16 on Form A and items 3, 5, and 30 on Form B. There is no problem with these items from a content perspective, but it may be that this particular content was not taught. Questions with a *negative* coefficient are *reverse discriminators* (indicating that more lower-scoring students get the question right than do higher-scoring students). No item in the *TEK* norming fell into this category.

Teachers also should be aware that the item discrimination coefficient does *not* adjust for the reading level or general ability of students. Thus, higher ability students may do well on a given question regardless of whether or not they have been taught economics. It is unlikely, however, that higher ability students without economics will do better than higher ability students with economics on the overall test.

Item Responses. Tables 12 and 13 show the percentages of students responding to the four options on a *TEK* test item, with the percentage for the correct response in bold face and with an asterisk. An analysis of item responses can be useful. For example, if a substantial percentage of students answered A when the correct answer was C, the teacher would do well to study distractor A to determine the reason why students selected the incorrect response. It should also help to consult the Item Rationales (Sections 7 and 8) for explanations for the correct answers.

One note of caution should be offered for Tables 12 and 13. What is reported is the combined percentage correct on items for all students in the norming sample, both with and without economics. This percentage correct may be lower than expected because a large portion of the total sample has not been taught economics.

TABLE 12. Percentage Response to Each Alternative: *TEK-A* (n = 1,921)

Grades 8-9

Item	A	B	C	D	Blank
1	11	19	17	**45***	8
2†	6	15	**48***	24	7
3†	30	9	**34***	20	8
4†	7	7	13	**67***	6
5	9	**55***	22	10	4
6	**46***	13	15	20	6
7	25	**43***	15	9	8
8†	7	7	**75***	7	4
9	**64***	13	12	5	6
10	14	**62***	10	8	7
11	22	**41***	19	11	8
12	11	**46***	20	18	4
13†	**77***	6	5	8	4
14†	6	**73***	8	10	4
15	15	25	18	**33***	10
16	9	15	15	**58***	3
17	**49***	33	9	5	4
18	**54***	15	12	16	3
19	11	**58***	15	11	5
20	**61***	8	10	16	4
21	11	21	13	**50***	5
22	8	31	**48***	8	5
23†	**45***	8	34	8	6
24†	6	18	14	**58***	5
25	14	12	8	**62***	4
26	17	16	**50***	12	5
27	20	10	**55***	10	4
28	4	**81***	6	5	3
29†	5	30	8	**54***	4
30	38	11	**28***	18	5
31†	5	19	12	**60***	5
32	16	**26***	37	15	6
33	21	17	13	**46***	3
34	14	22	**41***	16	7
35	**50***	21	8	15	7
36	10	27	**50***	8	5
37	8	**56***	20	12	4
38	18	15	**43***	18	6
39	**42***	20	17	17	5
40	**38***	19	20	16	6

Notes: (1) *Correct answer
(2) †item on both forms

TABLE 13. Percentage Response to Each Alternative: *TEK-B* (n = 1,831)

Grades 8-9

Item	A	B	C	D	Blank
1	16	**56***	14	9	6
2†	6	15	**46***	26	8
3†	28	9	**35***	20	8
4†	7	8	13	**67***	6
5	25	10	**42***	16	7
6	21	**44***	22	6	7
7	**58***	17	9	12	4
8†	8	7	**73***	8	4
9	**67***	9	7	13	4
10	9	**62***	8	17	5
11	14	28	**40***	8	10
12	**61***	13	10	10	6
13†	**76***	6	5	9	4
14†	7	**73***	8	9	3
15	9	19	28	**37***	7
16	23	**47***	7	20	4
17	**60***	9	12	15	4
18	22	29	12	**34***	4
19	11	9	34	**42***	4
20	10	18	**54***	13	4
21	20	15	**56***	5	5
22	32	5	16	**42***	5
23†	**42***	8	35	9	8
24†	6	18	14	**56***	5
25	21	12	19	**41***	7
26	14	25	**35***	22	4
27	4	**82***	6	4	4
28	**43***	20	14	16	7
29†	4	29	9	**55***	4
30	12	23	29	**20***	16
31†	5	20	11	**59***	5
32	6	**40***	16	35	3
33	**59***	4	25	9	4
34	18	16	**42***	18	7
35	**54***	16	17	9	5
36	17	19	**51***	8	5
37	**38***	16	13	27	7
38	20	**36***	24	11	8
39	17	**29***	43	6	5
40	16	**56***	10	10	8

Notes: (1) *Correct answer
(2) †item on both forms

Reliability

The reliability of a test is the degree of consistency with which a test measures student performance. For example, two students taking the same test are likely to obtain different scores, but each student taking the test again (without intervening instruction in the subject tested) should obtain about the same score as the first time. Many factors (including practice in taking the test and guessing) cause changes in student performance from day to day. As a result, we can never measure a student's performance perfectly (that is, obtain a student's "true" score).

SEM. Fortunately, it is possible to estimate the amount of variation in test scores that is due to measurement error, and therefore to specify a range within which one can be relatively certain the "true" score will fall. By taking account of such measurement error, the reliability of the test as a whole can be estimated.

The standard error of measurement (SEM), which is reported in Table 6 for Forms A and B, is an estimate of the amount of variation that can be expected in a test score (Linn & Gronlund, 2000, pp. 119-125). A raw score of 24 on a test with an SEM of 2.85 indicates about 67 percent certainty that a person's "true" score lies in a range from 21.15 to 26.85 (24 ± 2.85), or that we can be 95 percent certain that the "true" score lies in a range from 18.30 to 29.70 [24 ± (2 x 2.85)]. The smaller the SEM, the more accurate a test is as a measuring instrument. Individual test scores are best thought of as lying within a range, rather than as a single score, because of our inability to measure perfectly (the SEM is never zero).

Alpha. Another measure of overall test reliability is the coefficient alpha (Cronbach, 1951). It is a measure of the internal consistency among test items for measuring the common focus of the test, which for the *TEK* is economics achievement in the eighth and ninth grades. One way to conceptualize internal consistency is to think of splitting the test in half and correlating student scores on both halves. The alpha coefficient provides an estimate of the average of all possible split half correlations.

The alpha statistic ranges from zero to 1.00. The higher the coefficient, the better items work together in measuring the test construct, and thus the greater the statistical reliability of the test. An alpha of 1.00 would indicate a perfectly reliable test, while a coefficient of zero would indicate a totally unreliable one. The alphas of 0.86 for Form A and 0.85 for Form B of the *TEK* indicate that there is good internal consistency among items and that both forms of the *TEK* are highly reliable measures of economic achievement among high school students.

It should be stressed that the reliability of the *TEK* is substantially higher than that of most teacher-made tests in economics for eighth or ninth grades. The major question to be determined by each user of the *TEK* is whether the test as a whole — and the individual questions on it — are appropriate for the testing of his or her students. The use of a normed, reliable, and valid standardized test such as the *TEK* has much to recommend it to the teacher. National instruments such as the *TEK* are carefully designed and developed to reflect the subject matter that *ought* to be taught (and tested). The national norming data provided significant detailed evidence on the properties and characteristics of the instruments, including substantial statistical support. Classroom tests made by teachers are unlikely to attain these standards for test development and norming.

Some teachers may feel that the questions on national tests have too broad a focus and cover concepts that the teacher does not teach. The concept coverage in national tests, however, is broad simply because they reflect consensus among a panel of national experts as to what ought to be taught in a given subject. In short, the use of standardized achievement tests such as the *TEK* for measuring achievement in a subject has many advantages (cf. Linn & Gronlund, 2000, pp. 406-409).

Validity

Substantial evidence was collected for establishing the validity of the *Test of Economic Knowledge* as an achievement measure of economic understanding among eighth or ninth graders. This validity evidence was of two types: content and construct.

Content. A most important question for an educational achievement test such as the *TEK* is whether or not it measures what *ought* to be measured. This question cannot be answered by reference to statistics. The work that was done to establish the *content validity* of the *TEK* was described in detail in Sections 1 and 2 of this manual. In brief, the specification of the economic content that should be represented on this test was explained the *Voluntary National Content Standards in Economics* (CEE, 2010). This document served as the guide for the development and selection of test questions to be included on the *TEK*. The results of this work are shown in the content specification tables (Tables 1 and 2). In addition, the item rationales in the next two sections give an explanation for the correct answer for each test item that is based on the economic content in this document. Finally, the *TEK* covers economic content that is considered to be important in instruction for students in middle school or the beginning of high school.

The process used for test development also ensured that the items on the *TEK* would contain valid content as outlined in the *Standards*. This work was conducted by members of the national committee (NAC), who collectively had expertise in teaching economics, developing economics curricula, training teachers in economics, and in the preparation of national tests in economics (see Appendix 1 for a list of NAC members). The NAC and the test developers also evaluated the content of questions for any potential bias or reading problems that would affect the performance by different types of eighth or ninth grade students. All items were field tested with students and checked by teachers before they were included on the norming version of the test.

The content validity of the *TEK* was determined by comparing the test questions with the content judged to be important by authoritative academic experts and sources in economics and economic education. It is not a test of faddish or popular notions of economics. Nevertheless, there is no one standard for content validity. Whether the *TEK* is a valid test often depends on the purpose for which it is used. Some teachers or test users may disagree with the economic content emphasized by the test developers and the academic economists, council and center directors, and teachers who served on the national committees for this test project. For those teachers, the *TEK* may not be content valid for the purposes for which they want to use the test.

Construct. There is substantial evidence from the norming sample on the *construct* validity of the *TEK*. Construct validity refers to the ability of the test to measure the underlying construct or focus of the test. The *TEK* is designed to measure "economic understanding" among middle school and beginning high school students. One type of evidence for construct validity that is presented is whether the test performs well with different groups of students and in the expected direction.

As shown in Table 6, eighth and ninth grade students with economics instruction scored 3.95 points higher on Form A, compared to students without economics instruction. On Form B, the difference for students with economics was +4.28 points relative to students without economics. These are statistically significant differences in performance in the expected direction. The probability that the differences arise due to chance is virtually zero (probability less than 0.001).

A further check on the construct validity of any individual test item may be made by reviewing the performance on each item for students with and without economics instruction (Tables 10 and 11). By comparing the percent correct from each group, it is clear that the "with economics" group performed better than the "without economics" group on almost all of the 40 items on each form of the *TEK*.

Score Breakdowns by Other Factors. Tables 14 and 15 present some additional descriptive statistics derived from the total norming sample by form of the *TEK*. The data are broken down by gender, grade level, size of the school, student/teacher ratio at the school, the composition of schools by race (percent black), ethnicity (percent Hispanic), estimate of poverty level (percent free lunch), the type of community, and geographic region. For each subgroup, the mean *TEK* score, standard deviation, and subgroup sample sizes are given. As the tables show, the distinctions between those students with and those without economics prevail across almost all categories for which there are complete data. Performance on the *TEK* is responsive to instruction in economics, regardless of the characteristics. These breakdown data indicate that there is *construct* validity to the *TEK*.

The compilations by gender and grade level were obtained from student replies. The data on school size, student/teacher ratio, the composition of schools by race (percent black), ethnicity (percent Hispanic), estimate of poverty level (percent free lunch), and type of community, and region were obtained from school information in a U.S. Department of Education database.

There are the expected differences for those with and without economics across these categories. There are also differences within categories (e.g., gender) that may suggest that there is some bias in test items. The test developers and national committee, however, reviewed all items for bias in the content and wording that would disadvantage particular groups.

At this point, it is important to stress that these categorical breakdowns must be interpreted with caution. The reason is that some of the cell sizes (the subgroup *n*'s) are small. The breakdowns are also for single characteristics without control over other characteristics. To control for confounding caused by other factors requires the use of more advanced statistical procedures and careful model development that are beyond the scope of this manual.

Testing at Other Grade Levels. Teachers at higher or lower grade levels may wish to use the *TEK* with students, but there are no norms for those grade levels. This design was intentional. The test developers did not want to stretch the test across too many grade levels. Seventh grade teachers may use the *TEK*, or alternatively the *Basic Economics Test* (Walstad, Rebeck, and Butters, 2010) that was normed for the fifth and sixth grades. Seventh grade students should perform *below* the norms for eighth and ninth graders on the *TEK* and *above* the norms for the fifth and sixth graders on the *BET*. Tenth grade teachers may use the *TEK*, or alternatively the *Test of Economic Literacy* (*TEL*) (Walstad and Rebeck, 2001), that is normed for grades 11 and 12. Tenth grade students should perform above the norms for eighth and ninth graders on the *TEK* and *below* the norms for the eleventh and twelfth graders on the *TEL.* Whether the *TEK* is a valid or reliable test for students at lower or higher grades beyond the norming range will have to be determined by the teacher who wants to use the *TEK*.

Reading level. The reading level was checked using the Flesch-Kincaid readability formula. The results show a 6.2 reading grade level for test items on both forms of the *TEK*. The reading level for the *TEK* should be appropriate for most eighth and ninth grade students who take either form of the test.

Conclusion. The *Test of Economic Knowledge* should be a valuable tool for assessment of instruction for the middle school and lower high school grades. It should also be useful for researchers and curriculum developers, as well as teachers. The test has sound content validity and each item was carefully written and revised as needed to provide reliable information about the economic understanding of students.

With the discussion of the validity of the *TEK* now complete, the focus turns to the economic content of each test question and the rationale for the correct answer for each item. The information is presented in the next two sections of the manual (Sections 7 and 8).

TABLE 14. Descriptive Statistics for Groups within the Total Norming Sample: *TEK-A*

	With Economics			Without Economics		
	Mean	Std. Dev.	Number	Mean	Std. Dev.	Number
By student gender						
Females	23.74	6.94	250	19.82	6.94	682
Males	23.45	7.05	263	19.46	7.59	726
By grade level						
Grade 8	21.79	7.64	345	19.08	7.31	748
Grade 9	27.27	7.15	168	20.27	7.20	660
By school size						
< 700 students	20.36	7.07	268	20.12	7.37	686
>= 700 students	27.12	7.24	245	19.17	7.17	721
By teacher/student ratio						
< 16 students	24.10	7.85	241	20.33	7.55	598
>= 16 students	23.49	8.10	229	19.17	6.99	788
By % black in school						
< 9%	25.81	7.74	270	20.73	7.36	712
>= 9%	21.40	7.50	219	18.54	7.06	658
By % Hispanic in school						
< 4%	24.08	8.05	356	21.01	7.35	612
>= 4%	23.19	7.62	133	18.60	7.08	758
By % free lunch in school						
< 22%	27.09	7.29	140	20.45	7.20	600
>= 22%	19.52	6.86	211	17.48	6.67	499
By type of community						
Large city	26.10	7.82	171	18.60	6.80	129
Mid-size central city	24.09	9.09	11	19.35	7.54	135
Urban fringe large MSA*	23.62	8.20	156	19.16	7.36	518
Urban fringe mid-size MSA	21.50	7.03	103	21.74	6.36	150
Small town	19.95	6.71	38	18.21	6.87	146
Rural outside MSA	—	—	—	18.34	6.82	90
Rural within MSA	29.90	5.55	10	21.40	7.62	239
By USA region						
Northeast	22.70	6.46	10	24.40	7.23	50
Midwest	23.46	8.60	150	21.17	7.06	529
South	22.99	7.63	298	18.36	7.14	777
West	27.33	6.74	55	18.46	6.86	52
All students	23.59	7.91	513	19.64	7.28	1,408

*metropolitan statistical area

TABLE 15. Descriptive Statistics for Groups within the Total Norming Sample: *TEK-B*

	With Economics			Without Economics		
	Mean	Std. Dev.	Number	Mean	Std. Dev.	Number
By student gender						
Females	22.90	7.40	242	19.02	6.68	677
Males	23.51	7.95	241	18.83	7.03	671
By grade level						
Grade 8	21.47	7.47	323	18.76	6.67	702
Grade 9	26.69	6.90	160	19.10	7.05	646
By school size						
< 700 students	20.31	7.22	249	19.37	6.97	653
>= 700 students	26.28	6.94	234	18.50	6.72	695
By teacher/student ratio						
< 16 students	23.24	7.69	236	19.59	6.95	573
>= 16 students	23.40	7.81	211	18.46	6.72	758
By % black in school						
< 9%	25.00	7.10	247	20.15	7.14	664
>= 9%	21.51	7.91	214	17.80	6.36	649
By % Hispanic in school						
< 4%	23.91	7.58	333	20.31	7.01	590
>= 4%	22.01	7.82	128	17.90	6.54	723
By % free lunch in school						
< 22%	26.26	7.05	136	19.86	6.85	566
>= 22%	19.66	7.24	202	16.93	6.13	495
By type of community						
Large city	25.65	7.47	157	17.88	6.43	116
Mid-size central city	20.75	6.94	12	17.28	7.01	132
Urban fringe large MSA*	22.97	7.67	142	18.70	6.68	490
Urban fringe mid-size MSA	20.90	7.71	104	21.64	6.59	148
Small town	22.51	6.61	37	17.83	6.69	145
Rural outside MSA	—	—	—	17.59	6.33	85
Rural within MSA	26.00	5.83	9	20.30	7.12	232
By USA region						
Northeast	27.27	7.07	11	24.62	6.66	50
Midwest	22.49	7.65	137	20.28	6.89	492
South	22.70	7.83	289	17.73	6.56	757
West	27.48	5.06	46	17.84	5.84	49
All students	23.20	7.68	483	18.92	6.85	1,348

*metropolitan statistical area

7. ITEM RATIONALE: *TEST OF ECONOMIC KNOWLEDGE*

FORM A

ITEM	RATIONALE
1. *The economic problem of scarcity means that for individuals, governments, and societies the* a. *supply of goods and services is greater than the demand for them.* b. *prices of goods and services are greater than the value of consuming them.* c. *costs of producing goods and services are greater than the benefits of having them.* ***d. wants for goods and services are greater than the available resources to meet them.***	Resources used to produce goods and services are limited. People's wants for the goods and services that are produced with resources are virtually limitless. This disparity between production ability and wants leads to the economic problem of scarcity. The other options are not valid. Surpluses exist when the amount supplied of goods and services is greater than the amount demanded. The problem of scarcity is not defined as prices greater than values or costs greater than benefits. [1/8/1] [*Code for bracket: Standard/Grade Level/Benchmark (CEE, 2010)*]
2. *One consequence of scarcity is that* a. *there is full employment of resources.* b. *the production of goods and services is constant.* ***c. people have to make choices among alternatives.*** d. *products which are plentiful have relatively high prices.*	Scarcity exists because economic wants are greater than the limited resources available to satisfy them, so people have to make decisions about how best to use their scarce resources. Scarcity, therefore, forces people to make choices from among alternatives. None of the other options are valid. Scarcity does not create full employment, nor does it mean production is constant. Plentiful products often have lower rather than higher prices. A & B. [1/8/1]
3. *The opportunity cost of a decision is the* a. *money spent making a choice.* b. *worst choice that could have been made.* ***c. value of the next best alternative not chosen.*** d. *total benefit expected from all forgone opportunities.*	Opportunity cost is the next best alternative that is given up when a choice is made. For example, the opportunity cost of deciding to watch a movie for two hours is what would have been the next best use of the two hours of time. None of the other options are correct definitions of opportunity cost. A & B. [1/4/5]
4. *Which of the following is typically true?* a. *Correct choices have no costs.* b. *People do not respond to incentives.* c. *Voluntary trade causes winners and losers.* ***d. People's choices have consequences for the future.***	There are future consequences for every choice. The other options make no sense and are incorrect. In making any choice, there will be an opportunity cost — the next best alternative that could have been chosen. People do respond to monetary and non-monetary incentives in predictable ways. Both the buyer and seller expect to gain from voluntary trade because otherwise the transaction would not occur. A & B. [1/8/3]

ITEM	RATIONALE
5. *It will cost Amanda an extra $30 to purchase a warranty for a $400 new camera that she is buying. If Amanda decides to buy the warranty she has concluded that the* a. *cost of the warranty is greater than its benefit.* **b. *benefit of the warranty is greater than its cost.*** c. *cost of the camera is greater than the cost of the warranty.* d. *benefit of the camera is greater than the benefit of the warranty.*	All choices involve weighing benefits and costs. Amanda compared the benefits and costs of her decision. In making her choice, Amanda perceives the benefit of having the warranty to be greater than its cost. None of the other options are valid. Amanda will only buy the warranty if its cost is less than the cost of the camera, but this is not sufficient reason to purchase the warranty. Amanda would compare the benefit of the warranty with its cost, not with the benefit of the camera. [2/8/1]
6. *There is little government ownership of farms and businesses in the country of Mala. People may change jobs and start new businesses. The government does not control prices and wages. What type of economy is Mala?* **a. *Market economy.*** b. *Political economy.* c. *Command economy.* d. *Traditional economy.*	Mala is best described as a market economy, which has extensive private ownership of resources. The private decisions of consumers, resource suppliers, and businesses determine how resources are allocated. A command economy is an economic system in which property resources are publicly owned and central economic planning directs economic activity. A traditional economy is an economic system in which custom and tradition determine how scarce resources will be allocated. There is not information to determine if Mala is a political economy and the term does not provide a good description of an economic system. [3/8/2]
7. *Which is true about who gets the goods and services that are produced?* a. *Most societies have an equal distribution of goods and services.* **b. *No method of distributing goods and services will satisfy everyone.*** c. *All methods of distributing goods and services will satisfy everyone.* d. *All societies use the same method for distributing goods and services.*	Because productive resources are scarce, all societies must decide what goods and services to produce, how they should be produced, and who will get the goods and services that are produced. Different societies use different methods to answer these questions, but because of scarcity, no method can provide enough of all products to satisfy everyone. [3/4/1]
8. *What is the most likely reason why a business would cut the price of a product it sells?* a. *To reduce the economic profit.* b. *To decrease the number of workers.* **c. *To encourage more people to purchase the product.*** d. *To increase investment in other business operations.*	People behave in predictable ways when incentives change. Businesses understand that lower prices are an incentive for buyers to buy more. If selling more at a lower price increases revenue, this would be a reason to cut price. A business would not want to cut price if this reduces economic profit, and cutting the price would not be used to decrease the number of workers it employs or increase its investment in other business operations. A & B. [4/8/2]

ITEM	RATIONALE
9. Expansion of international trade usually ***a. increases worldwide production.*** *b. increases worldwide unemployment.* *c. decreases worldwide interdependence.* *d. decreases worldwide living standards.*	International trade usually increases worldwide production of goods and services because it permits greater specialization and division of labor among nations, and leads each nation to produce those goods and services at which it is relatively most efficient. Increased trade increases worldwide interdependence and living standards, but decreases unemployment overall. [5/8/2]
10. If a high tariff was placed on steel shipped into the U.S., *a. the price of steel would go down.* ***b. U.S. consumers would pay more for steel.*** *c. foreigners would buy more goods from the U.S.* *d. U.S. reserves of iron ore would last a longer time.*	A tariff is a tax on an imported good or service. A tariff placed on imported steel would increase the cost of imported steel and U.S. consumers would end up paying more for steel, not less. Also, U.S. consumers would import less steel from other countries and this would reduce, not increase, the amount of goods foreigners would buy from the United States. [5/8/3]
11. Specialization and trade lead to *a. less economic interdependence.* ***b. lower costs of goods and services.*** *c. fewer choices of goods and services.* *d. fewer exchanges of goods and services.*	Specialization increases output per worker and therefore lowers production costs. Specialization combined with trade forces more economic interdependence and exchange of goods and services because people must rely on the production of others. The greater productivity from specialization leads to more production and thus more choices of products. [6/8/2]
12. In the United States, prices for most goods and services are determined by the actions of *a. workers and labor unions.* ***b. businesses and consumers.*** *c. consumers and the government.* *d. businesses and the government.*	In the U.S. economy, the actions of businesses and consumers determine the prices for most goods and services. Competition among business firms for the consumer's dollar and the actions of consumers seeking to maximize their satisfaction lead to prices through the interaction of supply and demand. Labor unions do not directly influence the prices of most products, and the government sets prices for comparatively few products in the U.S. economy. [7/8/1]
13. Why are diamonds more expensive than water even though water is necessary for life and diamonds are not? ***a. Diamonds are more scarce than water.*** *b. Water is more scarce than diamonds.* *c. The demand for water is decreasing.* *d. The supply of diamonds is increasing.*	Relative prices measure the relative scarcity of items — the amount available for purchase compared to the amount buyers want. By comparing the price of one resource or product to another, one can infer how scarce one is relative to the other. In this case, relative scarcity, not necessity, is why diamonds are expensive compared to water. Because the quantity of diamonds available for purchase are very limited compared to water, and consumers value both, diamonds are more expensive than water. A & B. [7/8/2]

ITEM	RATIONALE
14. At the end of winter, retail clothing stores still have many winter coats for sale. The retail store owner can eliminate the *a. surplus by raising the price.* ***b. surplus by lowering the price.*** *c. shortage by raising the price.* *d. shortage by lowering the price.*	When the amount sellers are willing to sell is greater than the amount buyers are willing to buy at a certain price, a surplus exists. Reducing the price of winter coats will increase the amount buyers are willing to buy and eliminate the surplus. Raising the price would make it harder to sell the coats. A shortage exists when the amount sellers are willing to sell is less than the amount buyers are willing to buy at a certain price. A & B. [7/8/4]
15. A market-clearing price occurs when *a. deficits equal surpluses.* *b. shortages equal surpluses.* *c. total assets equal total liabilities.* ***d. quantity demanded equals quantity supplied.***	The market-clearing or equilibrium price is determined by the intersection of supply and demand. If the price is above the market-clearing price, quantity supplied will exceed quantity demanded, and the price will fall. If the price is below the market-clearing price, quantity demanded will exceed quantity supplied, and the price will rise. These price changes will work to equate sellers' production decisions with buyers' wants, or quantity demanded with quantity supplied. [7/8/3]
16. Chicken and fish are substitutes for each other. If the cost of raising chickens increases, then the price of chicken will *a. decrease and people will buy less fish.* *b. increase and people will buy less fish.* *c. decrease and people will buy more fish.* ***d. increase and people will buy more fish.***	An increase in the price of a good encourages consumers to look for substitutes to purchase in its place. In this case the price of chicken will increase due to the increased production costs, causing consumers to look for and purchase substitutes for chicken, such as fish. [8/8/1]
17. If there is a large decrease in demand for corn and no change in supply ***a. consumers will pay a lower price for corn.*** *b. consumers will pay a higher price for corn.* *c. there will be no change in the price of corn.* *d. there will be no change in the amount of corn sold.*	A large decrease in demand for corn, with unchanged supply, will mean that consumers will pay a lower price for corn. As the price falls, firms will choose to produce and bring to market less corn so that the amount of corn sold will not remain unchanged. [8/12/1]
18. The price of DVDs will decrease if the ***a. supply of DVDs increases.*** *b. supply of DVDs decreases.* *c. demand for DVDs increases.* *d. demand for DVDs increases and the supply decreases.*	In the supply and demand model, the price of DVDs will decrease if there is an increase in the supply of DVDs, all other things remaining the same. The other answers are not plausible. A decrease in the supply of DVDs would tend to increase the price, as would an increase in the demand for DVDs, or a combination of the two changes. [8/12/2]

ITEM	RATIONALE
19. *There used to be one producer of a good in a market and now there are many competing producers. What is most likely to be the result?* *a. Less service.* ***b. Lower product price.*** *c. Lower product quality.* *d. Less output produced in the market.*	A profit-maximizing monopoly will be willing to produce less output than many competing profit-maximizing firms, and the monopoly will charge a higher price. When there are many producers of a product competing with one another to sell to consumers, consumers benefit from paying a lower price for the good. Because price is not the only factor influencing which businesses consumers purchase from, firms often compete by providing more service and better quality. [9/8/2]
20. *Which is most likely to influence the level of competition in markets?* ***a. The number of buyers and sellers.*** *b. The size of the government budget.* *c. The amount of wages and salaries.* *d. The market-clearing price of a product.*	When many sellers of a product exist, consumers can choose among them, so any one firm must provide a comparable or better product at a reasonable price to stay in business. Many sellers therefore necessitate competition. When there are many buyers of a product, they must compete with one another to buy what is available for sale, and this places upward pressure on prices. The other options have no influence on the level of competition in markets outside of any influences on the number of buyers and sellers. [9/8/3]
21. *Banks make most of their profits by charging* *a. fees for advice on investments in stocks.* *b. fees for using automatic teller machines (ATMs).* *c. lower rates of interest to borrowers than they pay depositors.* ***d. higher rates of interest to borrowers than they pay depositors.***	Banks are institutions that channel money from depositors to borrowers. The interest banks pay depositors is a cost, and the interest they receive from borrowers is revenue, so banks charge a higher rate to borrowers than they pay depositors to make a profit. Although banks provide other services such as investment advice and ATMs, the lion's share of their profits come from loaning money at a higher interest rate than they pay for deposits. [10/4/1]
22. *Jody bought shares of stock in a company. She and the other stockholders voted to elect its board of directors. The company is a* *a. collective.* *b. partnership.* ***c. corporation.*** *d. proprietorship.*	Stockholders of a corporation are the owners of the corporation and they elect the board of directors. In contrast, a proprietorship is a form of business organization where a person is in business for himself or herself. A partnership is a business where two or more individuals agree to own and operate the business. A collective is an enterprise where there is public or community ownership of resources. [10/12/2]
23. *Amy is saving ten percent of her income a month. The money she saved is primarily functioning as a* ***a. store of value.*** *b. terms of trade.* *c. unit of account.* *d. medium of exchange.*	As a store of value, money on hand that is not spent on current consumption can be put aside and spent at a later date. This is the function the money saved is providing for Amy. Money also functions as a terms of trade or unit of account, where it is used to compare the market value of different products, and as a medium of exchange because it is accepted as payment for virtually all products. A & B. [11/8/1]

ITEM	RATIONALE
24. Which one of the following is correct? *a. Money is useful for saving, but not investing.* *b. It just takes money to produce goods and services.* *c. Trade is more difficult with money compared with barter.* ***d. Most nations create their own currency for use as money.***	Money makes trading easier by replacing barter with transactions involving currency. Over time, different countries have created their own forms of currency, and most of these different currencies still exist today. The other options are incorrect. Money is useful for both saving and investing, it takes resources, not money, to produce goods and services, and trade is more difficult with barter than money because money does not require a coincidence of wants among traders. A & B. [11/4/1]
25. Most wages and salaries in the United States are determined by *a. imports and exports.* *b. savers and investors.* *c. lawyers and bankers.* ***d. supply and demand.***	In the United States the wages and salaries, or the prices of different types of labor, are most often determined in the same way the price of products and other resources are determined, by the interaction of buyers and sellers. In the labor market, the buyers are employers and their decisions comprise the demand for labor. The sellers are the households and their decisions comprise the supply of labor. [13/8/3]
26. Which will result from an increase in the demand for construction workers? *a. A decrease in the price of housing.* *b. A decrease in the supply of housing.* ***c. An increase in the wage of construction workers.*** *d. An increase in unemployed construction workers.*	The wage of construction workers is determined in the competitive job market for that occupation. If the demand for construction workers increased, there would be a resulting increase in the wages for such workers. None of the other options are valid outcomes from an increase in demand for construction workers. [13/12/5]
27. Workers' wages usually increase when *a. the unemployment rate increases.* *b. the supply of workers increases.* ***c. demand for the products they produce increases.*** *d. businesses face more competition in selling their product.*	An increase in the demand for products produced by workers will usually increase workers' wages. This is because the demand for labor is a derived demand: derived from the demand for the goods and services labor produces. Increases in the supply of labor and in the unemployment rate will tend to depress wages. Increases in competitive pressures on businesses as they attempt to sell their products may or may not tend to push up wages. [13/8/3]
28. Most entrepreneurs start a new business because they expect to *a. avoid risk.* ***b. earn a profit.*** *c. decrease work hours.* *d. increase their human capital.*	Entrepreneurs start new businesses because they believe the businesses will earn a profit. Profit is the return or payment to an entrepreneur for starting a business. Entrepreneurs are risk-takers and work long hours. While starting a business may increase human capital, that is not the primary expectation or motivation for doing so. [14/8/5]

ITEM	RATIONALE
29. Advances in technology result in *a. a decrease in output.* *b. an increase in prices.* *c. a decrease in wages.* ***d. an increase in productivity.***	Advances in technology lead to improved capital goods (e.g., machines, computers and other equipment) and therefore increase productivity, or output per worker. Advances in technology lead to increases, not decreases, in output and wages, and to decreases in product prices, not increases. A & B. [15/8/4]
30. What usually causes the standard of living in a country to increase over time? *a. High taxes.* *b. High tariffs.* ***c. Increased output per worker.*** *d. Conservation of natural resources.*	Increased output per worker, or worker productivity, is the basic source of increases in real (inflation-adjusted) wage rates and the standard of living. Real income per worker-hour can only increase over time with increases in productivity. Increased output per worker means that more goods can be produced at a lower cost, thereby increasing profits, wages and incomes in that country. [15/8/1]
31. In what way is a fireworks display a public good? *a. It causes pollution and noise.* *b. It can be provided by several businesses.* *c. It requires expenditures for public safety.* ***d. It can be seen by those who do not pay for it.***	A fireworks display is an example of a *public good*, i.e., a good not subject to the exclusion principle. In other words, more than one person can benefit from a single fireworks show at the same time, and people's enjoyment, or consumption, of the fireworks show cannot be restricted to those people who paid for it. Pollution and noise, the number of providers, and public safety expenditures are not necessary traits of public goods. A & B. [16/8/1]
32. A major economic role that government is supposed to perform in a market economy is to *a. guarantee profits.* ***b. maintain competition.*** *c. set wages and salaries.* *d. establish production targets.*	Competition provides the basic regulatory framework in a market economy. It determines which businesses are profitable and the wages and salaries of workers. Labor unions will be established by the voluntary actions of workers. Unfortunately, the growth of monopolies will undercut competition and the self-regulation of a market economy. A major role for government, therefore, is to maintain competition by regulating monopoly power, and by outlawing unfair competitive practices that result in monopolies. [16/12/6]
33. A sales tax is a tax on *a. income.* *b. property.* *c. investment.* ***d. consumption.***	A sales tax is payment made to government based on spending or consumption. It is collected at the time the product is purchased and is usually a percentage of the price of the product. An income tax is levied on income earned, not consumption. A property tax is assessed on the value of real or personal property owned. Some investments are taxed as part of a property or income tax. [16/8/4]

ITEM	RATIONALE
34. What does the gross domestic product (GDP) measure? *a. The total assets and liabilities of a nation.* *b. The market value of products government buys each year.* ***c. The market value of final goods and services produced in a year.*** *d. The wages and salaries paid for productive work done during a year.*	The nation's gross domestic product measures the market value of all final goods and services produced in a year. Alternatively, it measures the total expenditures of consumers, businesses, governments, plus net exports. [18/8/1]
35. When comparing the standard of living in one nation's economy to another nation's economy, GDP is typically adjusted in each nation by dividing *GDP by a nation's* ***a. population.*** *b. inflation rate.* *c. square miles.* *d. unemployment rate.*	A nation's gross domestic product (GDP) is the basic measure of a nation's output and income. A people's standard of living depends not on the total amount of income, but on income per person. Standard of living is measured by income per capita, or GDP/population. [18/8/4]
36. Inflation is the term used to describe *a. a decrease in interest rates.* *b. an increase in interest rates.* ***c. a general increase in prices.*** *d. a general decrease in prices.*	Inflation is a general increase in the level of prices in an economy. The key word is "general" increase. Prices of certain products will rise and fall, but when prices rise for many goods and services, the economy is experiencing inflation. [11/4/5]
37. Which of the following people would the U.S. government count as unemployed? *a. A part-time cashier who is unhappy with her wage and looking for a full-time position.* ***b. A high school graduate who has not yet found a job but continues looking.*** *c. A college student who decides not to work during the school year.* *d. A retired scientist who is living on her pension.*	To be classified as unemployed by the U.S. Labor Department, a person must not have a job *and* must be looking for a job. A part-time worker has a job and is considered employed regardless of whether or not he or she is looking for a full-time position. A retired person and the college student are not actively looking for a job, so he or she is not considered part of the labor force. [19/8/1]

ITEM	RATIONALE
38. To know if an increase in wages over a period of time has led to an increase in the standard of living, we must also look at changes in *a. interest rates.* *b. prices on the stock market.* ***c. prices of goods and services.*** *d. government spending and taxes.*	To compare changes in wages over time, it is necessary to distinguish between nominal wages and real wages. Nominal wages are the amount of money income received per unit of time for labor services. Real wages are the quantity of goods and services which can be purchased with nominal wages. To determine if an increase in nominal wages leads to an increase in workers' standards of living (an increase in real wages), it is necessary to know by how much the prices of goods and services changed. [19/8/2]
39. Government spending less than taxes collected during a year is called ***a. a budget surplus.*** *b. a budget deficit.* *c. the national debt.* *d. the balanced budget.*	If the government spends less money than it collects in tax revenues in a fiscal year, there will be a budget surplus. A budget deficit exists when tax revenues are less than expenditures. The national debt of the federal government is the accumulation of budget deficits over time and is reduced by budget surpluses. When the budget is balanced, expenditures equal tax revenues. [20/12/4]
40. The control of the money supply is the main responsibility of the ***a. Federal Reserve System.*** *b. Internal Revenue Service.* *c. Department of Commerce.* *d. Federal Trade Commission.*	The Federal Reserve System was created by an act of Congress in 1913. The main responsibility of the Federal Reserve is to control the nation's money supply. The other options can influence economic conditions, but they do not control the money supply. [20/12/7]

8. ITEM RATIONALE: *TEST OF ECONOMIC KNOWLEDGE* (Continued)

FORM B

ITEM	RATIONALE
1. *Scarcity is an economic problem* a. *only for low-income people.* **b. *for both low-income and high-income people.*** c. *only for people who live in developing countries.* d. *for people, but not for governments and nations.*	"Scarcity" in economics means that society has more wants than it has available resources to satisfy those wants. This is a fundamental concept of economics, and the problem of scarcity is faced by all people in every society. [1/8/1] [*Code for bracket: Standard/Grade Level/Benchmark (CEE, 2010)*]
2. *One consequence of scarcity is that* a. *there is full employment of resources.* b. *the production of goods and services is constant.* **c. *people have to make choices among alternatives.*** d. *products which are plentiful have relatively high prices.*	Scarcity exists because economic wants are greater than the limited resources available to satisfy them, so people have to make decisions about how best to use their scarce resources. Scarcity, therefore, forces people to make choices from among alternatives. None of the other options are valid. Scarcity does not create full employment, nor does it mean production is constant. Plentiful products often have lower rather than higher prices. A & B. [1/8/1]
3. *The opportunity cost of a decision is the* a. *money spent making the decision.* b. *worst choice that could have been made.* **c. *value of the next best alternative not chosen.*** d. *total benefit expected from all forgone opportunities.*	Opportunity cost is the next best alternative that is given up when a choice is made. For example, the opportunity cost of deciding to watch a movie for two hours is what would have been the next best use of the two hours of time. None of the other options are correct definitions of opportunity cost. A & B. [1/4/5]
4. *Which of the following is typically true?* a. *Correct choices have no costs.* b. *People do not respond to incentives.* c. *Voluntary trade causes winners and losers.* **d. *People's choices have consequences for the future.***	There are future consequences for every choice. The other options make no sense and are incorrect. In making any choice, there will be an opportunity cost — the next best alternative that could have been chosen. People do respond to monetary and non-monetary incentives in predictable ways. Both buyer and seller expect to gain from voluntary trade because otherwise the transaction would not occur. A & B. [1/8/3]

ITEM	RATIONALE
5. Ellie can buy one pack of gum for $0.75 or two packs for $1.00. If Ellie only buys one pack of gum, then Ellie must value the *a. first pack at less than $0.75.* *b. first pack at more than $1.75.* ***c. second pack at less than $0.25.*** *d. second pack at more than $0.50.*	Many decisions involve comparing marginal (additional) benefits and marginal costs. The second pack of gum will cost Ellie $0.25 more ($1.00-$0.75). Her decision not to buy reveals she values it at less than $0.25. The other options do not reveal why she buys only one pack. If she valued the first pack at less than $0.75 she would not buy any gum. If she valued the first pack at more than $1.75, it reveals nothing about her marginal benefit from a second pack. If she valued the second pack at more than $0.50, she would buy the second pack. [2/8/1]
6. In Econland, the government owns all the industries and farms. Production goals and wages are set by the government. It provides education, child care, and medical care for its citizens. Econland has a *a. traditional economy.* ***b. command economy.*** *c. market economy.* *d. barter economy.*	Econland has what is called a command economy. Governmental ownership of farms and industries, government's setting of wages and production goals, and the collective production of goods such as education, child care, and medical care are all characteristics of command economies. [3/8/2]
7. Which group has the most influence on what is produced in a market economy? ***a. Consumers.*** *b. Corporations.* *c. Labor unions.* *d. Federal government.*	In a market economy, consumers have the most influence over what is produced. Competitive markets force businesses to produce the products consumers demand at the lowest prices that will cover costs. If consumers do not like a particular product which businesses offer for sale, that product will not survive long in the marketplace. [3/8/2]
8. What is the most likely reason why a business would cut the price of a product it sells? *a. To reduce the economic profit.* *b. To decrease the number of workers.* ***c. To encourage more people to purchase the product.*** *d. To increase investment in other business operations.*	People behave in predictable ways when incentives change. Businesses understand that lower prices are an incentive for buyers to buy more. If selling more at a lower price increases revenue, this would be a reason to cut price. A business would not want to cut price if this reduces economic profit, and cutting the price would not be used to decrease the number of workers it employs or increase its investment in other business operations. A & B. [4/8/2]

ITEM	RATIONALE
9. *How would the U.S. be affected if it stopped all trade with other nations?* ***a. The standard of living would decline.*** *b. The quality of goods would improve.* *c. Consumers would have more choices.* *d. Producers would have more competition.*	International trade permits greater specialization and division of labor among trading nations, increases production, and increases standards of living. Domestic producers are also forced to compete with foreign producers, and this improves the quality of goods and the number of choices consumers face. If all trade was stopped, the U.S. standard of living would decline, as would competition among firms and therefore the quality and choices consumers face. [5/8/2]
10. *Which of the following is a tax on an imported product?* *a. A quota.* ***b. A tariff.*** *c. A subsidy.* *d. An embargo.*	A tariff is defined as a tax on an imported product. A quota is a restriction on the quantity of imports. An embargo is a ban on trade with another nation or on the import or export of products. A subsidy is support from government tax revenues that is paid to corporations or individuals to help or encourage them to stay in business and keep producing a product. [5/8/4]
11. *What is a benefit of specialization and division of labor?* *a. Decreased interdependence among workers.* *b. More workers are needed for each job.* ***c. Increased production per worker.*** *d. Less income per worker.*	Specialization and division of labor occur when people concentrate on producing fewer kinds of goods and services than they consume, which leads to increased output per worker. The other options are wrong. Specialization combined with trade forces more economic interdependence because people must rely on the production of others. Specialization leads to improved individual skills at tasks and allocates workers to what they do best, so it would not require more workers for each job. Increased output per worker would increase, not decrease, income per worker. [6/4/3-4]
12. *Canada, Germany and Japan are major U.S. trading partners. How might these countries be affected by a recession in the U.S.?* ***a. A decrease in their exports to the U.S.*** *b. A decrease in their unemployment rates.* *c. An increase in their standards of living.* *d. An increase in their choices of goods and services.*	Trade among nations leads to economic interdependence. As a result, economic conditions in one nation affect those of trading partners. A recession in the United States would decrease incomes of U.S. consumers and decrease U.S. demand for foreign goods, thus decreasing foreign exports to the United States. The other options are not valid. Less demand for Canadian, German and Japanese products would put upward pressure on their unemployment rates and downward pressure on their standards of living. A U.S. recession would not increase these countries' choices of goods and services. [6/8/3]

ITEM	RATIONALE
13. Why are diamonds more expensive than water even though water is necessary for life and diamonds are not? ***a. Diamonds are more scarce than water.*** *b. Water is more scarce than diamonds.* *c. The demand for water is decreasing.* *d. The supply of diamonds is increasing.*	Relative prices measure the relative scarcity of items — the amount available for purchase compared to the amount buyers want. By comparing the price of one resource or product to another, one can infer how scarce one is relative to the other. In this case, relative scarcity, not necessity, is why diamonds are expensive compared to water. Because the quantity of diamonds available for purchase are very limited compared to water, and consumers value both, diamonds are more expensive than water. A & B. [7/8/2]
14. At the end of winter, retail clothing stores still have many winter coats for sale. The retail store owner can eliminate the *a. surplus by raising the price.* ***b. surplus by lowering the price.*** *c. shortage by raising the price.* *d. shortage by lowering the price.*	When the amount sellers are willing to sell is greater than the amount buyers are willing to buy at a certain price, a surplus exists. Reducing the price of winter coats will increase the amount buyers are willing to buy and eliminate the surplus. Raising the price would make it harder to sell the coats. A shortage exists when the amount sellers are willing to sell is less than the amount buyers are willing to buy at a certain price. A & B. [7/8/4]
15. What is an exchange rate? *a. A general increase in the level of prices in a nation.* *b. The price of money that is borrowed or saved in a nation.* *c. The value of a nation's imports minus its exports.* ***d. The price of one nation's currency in terms of another nation's currency.***	In order for nations to trade with one another, exchange of currency must take place. An exchange rate is the amount of one nation's currency needed to purchase a unit of another nation's currency, or, stated differently, is the price of one nation's currency in terms of another's. The other options define other concepts: inflation is a general increase in prices; interest is the price of money borrowed; trade deficit is imports minus exports. [7/8/5]
16. An increase in the price of a good or service usually leads to *a. an increase in quantity demanded.* ***b. a decrease in quantity demanded.*** *c. no change in quantity demanded.* *d. either an increase or a decrease in quantity demanded.*	People respond in predictable ways to incentives. One universally understood principle in economics is that as the price of an item increases, ceteris paribus, people will buy less of the item, or stated differently, quantity demanded will decrease. [8/8/1]
17. If the demand for soybeans increases, producers will ***a. increase production and price.*** *b. decrease production and price.* *c. decrease production and increase price.* *d. increase production and decrease price.*	In the supply and demand model, the increase in the demand for soybeans will result in a shortage of soybeans. This shortage will lead to an increase in the price of soybeans, and producers will went to allocate more resources to soybean production. [8/12/1]

ITEM	RATIONALE
18. This month the price of oil was higher than last month and less oil was sold. Which of the following best explains these outcomes in a competitive market for oil? *a. An increase in demand.* *b. A decrease in demand.* *c. An increase in supply.* ***d. A decrease in supply.***	A decrease in supply is a shift left (or up) of the supply curve in the supply and demand model. If the supply of oil was to decrease, the amount of oil sold will fall and the equilibrium price of oil will rise. [8/12/3]
19. Improved technology in producing clothing usually will cause the supply of clothing to *a. decrease and the price to increase.* *b. decrease and the price to decrease.* *c. increase and the price to increase.* ***d. increase and the price to decrease.***	Improved technology in producing clothing will usually increase the supply of clothing and reduce its price. The effect of the technological change is to shift supply outward, forcing prices down and increasing sales to consumers. [8/12/2]
20. If a company is the only seller of a product, it is *a. a competitor.* *b. an oligopoly.* ***c. a monopoly.*** *d. a cooperative.*	A company which is the only producer of telephones (or any other product) is a monopoly by definition. An oligopoly means that there are "few sellers" (but more than one), while a cooperative is a number of producers or sellers who join together to market their output. If a monopoly is the only seller of the product it cannot be a competitor in that industry. [9/8/3]
*21. After people deposit money in their checking accounts at a bank, what does the bank do with **most** of this money?* *a. Gives it to the government.* *b. Invests it in the stock market.* ***c. Loans it to people and businesses.*** *d. Pays it to employees of the bank.*	Banks are institutions that channel money from depositors to borrowers. The interest banks pay depositors is a cost, and the interest they receive from borrowers is revenue, so banks charge a higher rate to borrowers than they pay depositors to make a profit. Although banks hold some of the deposits as reserves and use some of the deposits to pay expenses, most of the deposits are loaned to borrowers. [10/8/2]
22. When a union negotiates with an employer about wages and benefits for workers, you have *a. a strike.* *b. a lockout.* *c. a consumer boycott.* ***d. collective bargaining.***	The process of collective bargaining includes negotiations between a union and employer over wages and benefits. A strike may or may not result from collective bargaining, and in some instances, strikes occur because collective bargaining is *not* permitted. [10/8/3]

ITEM	RATIONALE
23. Amy is saving ten percent of her income a month. The money she saved is primarily functioning as a ***a. store of value.*** *b. terms of trade.* *c. unit of account.* *d. medium of exchange.*	As a store of value, money on hand that is not spent on current consumption can be put aside and spent at a later date. This is the function the money saved is providing for Amy. Money also functions as a terms of trade or unit of account, where it is used to compare the market value of different products, and as a medium of exchange because it is accepted as payment for virtually all products. A & B. [11/8/1]
24. Which one of the following is correct? *a. Money is useful for saving, but not investing.* *b. It just takes money to produce goods and services.* *c. Trade is more difficult with money compared with barter.* ***d. Most nations create their own currency for use as money.***	Money makes trading easier by replacing barter with transactions involving currency. Over time, different countries have created their own forms of currency, and most of these different currencies still exist today. The other options are incorrect. Money is useful for both saving and investing, it takes resources, not money, to produce goods and services, and trade is more difficult with barter than money because money does not require a coincidence of wants among traders. A & B. [11/4/1]
25. The supply of and demand for labor is the main determinant of *a. interest rates.* *b. savings rates.* *c. exchange rates.* ***d. wage rates.***	Wages in the United States, or the price of different types labor, are most often determined in the same way the price of products and other resources are determined, by the interaction of buyers and sellers. In the labor market, the buyers are employers and their decisions comprise the demand for labor. The sellers are the households and their decisions comprise the supply of labor. The other options are all prices, but only wage rates are the price of labor. [13/8/3]
26. The main reason a company decides to hire a new employee is because the company expects that *a. more employees will make the workplace more secure.* *b. more employees will allow each one to work fewer hours.* ***c. the worker will cost less than the revenue the worker will create.*** *d. the worker will discover new ways to produce the company's output.*	A profit-maximizing firm will produce and sell additional units of its output if the added input costs are less than the revenue the additional output will generate. It follows that a company will hire an additional worker, an input to production, if the cost of the worker is less than the revenue he or she will create. Although there exists many reasons why companies hire specific workers in specific circumstances, the predominant factor is profit. [13/8/1]

ITEM	RATIONALE
27. Which is the most likely reason Julia earns a high salary at a job? *a. A family member got her the job.* ***b. Her employer values the skills she has.*** *c. She has friends who work as company managers.* *d. There are many workers her employer could hire just like Julia.*	People's incomes reflect in part their human capital, or the abilities and skills they bring to the labor market. Those people with skills that employers value more will earn higher salaries than those with less-valued skills. The other options are far less likely to be the cause of Julia's high salary. [13/8/5]
28. An entrepreneur bears the risk of ***a. starting a business.*** *b. investing in the stock market.* *c. doing dangerous jobs or tasks.* *d. consuming untested products.*	Entrepreneurs are individuals who are willing to take risks associated with organizing resources (natural resources, labor resources and capital goods) in order to develop new products and start new businesses in the hope of earning a profit. [14/8/2]
29. Advances in technology result in *a. a decrease in output.* *b. an increase in prices.* *c. a decrease in wages.* ***d. an increase in productivity.***	Advances in technology lead to improved capital goods (e.g., machines, computers and other equipment) and therefore increase productivity, or output per worker. Advances in technology lead to increases, not decreases, in output and wages, and to decreases in product prices, not increases. A & B. [15/8/4]
30. Investment in human capital by an individual involves the following tradeoff: *a. More technology but less time to use it.* *b. More time to work but less technology to use.* *c. More consumption now but less expected consumption in the future.* ***d. Less consumption now but more expected consumption in the future.***	Investment in human capital results from investment in people through education and training. More human capital produces additional knowledge and skills, which can lead to a higher expected future income level. Investment in human capital does not come without a cost. Education and training is not free and can reduce current consumption. [15/12/3]
31. In what way is a fireworks display a public good? *a. It causes pollution and noise.* *b. It can be provided by several businesses.* *c. It requires expenditures for public safety.* ***d. It can be seen by those who do not pay for it.***	A fireworks display is an example of a *public good*, i.e., a good not subject to the exclusion principle. In other words, more than one person can benefit from a single fireworks show at the same time, and people's enjoyment, or consumption, of the fireworks show cannot be restricted to those people who paid for it. Pollution and noise, the number of providers, and public safety expenditures are not necessary traits of public goods. A & B. [16/8/1]

ITEM	RATIONALE
32. *In the United States, which of the following is provided* only *by government?* *a. Housing.* ***b. Police.*** *c. Railroads.* *d. Health care.*	In the U.S. economy, police are provided only by government because it is a public good. Private businesses would have great difficulty collecting fees from all who benefit once police protection is provided. Housing is provided by both governmental agencies and private enterprises. Health care is provided mostly by private individuals, hospitals, or clinics. Railroads are provided mostly by private businesses. [16/12/2]
33. *A federal program to provide the elderly with some retirement income is* ***a. Social Security.*** *b. Food Stamps.* *c. Medicare.* *d. Medicaid.*	Social Security contributions are redistributed to retired persons who have worked long enough to become eligible. They are also used to pay benefits to people who are disabled and to minor children of a parent who has died. Food stamps, Medicare, and Medicaid are also government programs, but focus on other needs and not on retirement income or direct assistance for minor children of a parent who has died. [16/8/3]
34. *The best measure of total economic output in the United States is the* *a. inflation rate.* *b. consumer price index.* ***c. gross domestic product.*** *d. average personal income.*	The gross domestic product is a measure of the market value of the total output of final goods and services produced in one year by the United States economy. The inflation rate measures the increase in the general level of prices of goods and services in a year. The consumer price index measures the changes in a fixed market basket of goods and services and is one measure of the inflation rate. Average personal income is a measure of income received by households, but does not reflect the amount of output of goods and services that households produce. [18/8/1]
35. *When consumers make purchases, goods and services are transferred from* ***a. businesses to households in exchange for money.*** *b. households to businesses in exchange for money.* *c. government to households in exchange for taxes.* *d. households to government in exchange for taxes.*	An economy consists of the interactions of many institutions. In a market economy, consumer goods and services are produced by businesses and sold to households (consumers) for money. [18/8/5]
36. *Inflation is a period of* *a. increasing unemployment.* *b. a general rise in production.* ***c. a general rise in the price level.*** *d. decreasing government deficits.*	Inflation is defined as a period during which a general rise in the price level occurs. An increase in the price for one or two goods is *not* inflation. Inflation refers to an increase in the prices of all or most goods and services. [11/4/5]

ITEM	RATIONALE
37. There is high unemployment in an economy. This condition means that the economy's ***a. output is less than its potential.*** *b. exports are greater than imports.* *c. business investment is rising.* *d. inflation rate is rising.*	If resources are sitting idle, this is production potential lost, and output is said to be at less than potential. It follows that if there exists high unemployment, output could be increased if the unemployed, or idle, resources were put to use, so output must be less than its potential. The other options are not associated with high unemployment. A trade surplus (exports greater than imports) can exist at high or low unemployment; business investment is less likely to rise during high unemployment; and inflation is less likely to rise during high unemployment. [19/12/5]
38. When people's incomes increase more slowly than the inflation rate, *a. the value of savings increases.* ***b. the purchasing power of incomes decreases.*** *c. the cost of production for businesses increases.* *d. the spending by government on public goods decreases.*	The inflation rate measures the rate at which prices of goods and services rise over time. Because of inflation, more income is needed to buy the same amount of goods and services as their prices increase. Purchasing power is the term used to describe the amount of goods and services a given level of income can purchase. It follows that if the inflation rate is greater than the rate at which incomes are increasing, purchasing power will decrease. [19/8/2]
39. Government spending greater than taxes collected during a year is called *a. a budget surplus.* ***b. a budget deficit.*** *c. the national debt.* *d. the balanced budget.*	If the government spends more money than it collects in tax revenues in a fiscal year, there will be a budget deficit. A budget surplus exists when tax revenues exceed expenditures. The national debt of the federal government is the accumulation of budget deficits over time and is reduced by budget surpluses. When the budget is balanced, expenditures equal tax revenues. [20/12/4]
40. The main responsibility of the Federal Reserve System is to *a. decrease government spending.* ***b. control the nation's money supply.*** *c. enforce the nation's antitrust laws.* *d. insure the nation's military security.*	The Federal Reserve was created by an act of Congress in 1913. The main responsibility of the Federal Reserve is to control the nation's money supply. The other alternatives are primarily the responsibility of other government branches or units. [20/12/7]

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Appendix 1. Staff and Committee for the *Test of Economic Knowledge* (Second Edition)

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Appendix 2. Schools Participating in Norming the *TEK*

ALABAMA

Wellborn Elementary
Anniston 36201-5801

ALABAMA

Holy Spirit School
Huntsville 35802-1310

ALASKA

Juneau Douglas High School
Juneau 99801-8529

ARIZONA

Arizona Virtual Academy
Tucson 85714

BASIS Tucson
Tucson 85716

Highland High School
Gilbert 85296-1016

Kyrene Middle School
Tempe 85284-2108

ARKANSAS

Chaffin Junior High School
Fort Smith 72903-5297

McNair Middle School
Fayetteville 72703

Mountain View High School
Mountain View 72560-9636

Southwest Junior High School
Springdale 72762

CALIFORNIA

The Academy of Finance
Los Angeles 90018-4546

Bishop O'Dowd High School
Oakland 94605-4702

The Bishop's School
La Jolla 92037

La Sierra High School
Riverside 92505-2938

Mater Dei High School
Santa Ana 92707-2126

Valley View High School
Moreno Valley 92555-4504

COLORADO

Woodrow Wilson Academy
Westminster 80021

CONNECTICUT

North End Middle School
Waterbury 06704-1270

DELAWARE

Beacon Middle School
Lewes 19958-1598

Concord High School
Wilmington 19810-1198

Delmar Middle School
Delmar 19940-1399

Dover High School
Dover 19904-2899

Fifer Middle School
Camden 19963-2920

Laurel Senior High School
Laurel 19956-1491

Milford Middle School
Milford 19963-2920

Redding Middle School
Middletown 19709-1140

W. T. Chipman Middle School
Harrington 19952-1098

William Penn High School
New Castle 19720-4295

FLORIDA

Bair Middle School
Sunrise 33322-3718

Belle Vue Middle School
Tallahassee 32304-3904

Crystal River Middle School
Crystal River 34428-4315

Deland Middle School
Deland 32724-7897

Global Impact Ministries (GIM) Academy
Jacksonville 32218

Gulf Coast Academy of Science and Technology
Spring Hill 34608

Hialeah-Miami Lakes Senior High School
Hialeah 33014-3534

Indian Ridge Middle School
Davie 33324-4222

Jefferson Senior High School
Tampa 33607-4006

Jennings Middle School
Seffner 33324-4222

Kathleen Middle School
Lakeland 33810-1955

Lauderdale Lakes Middle School
Lauderdale Lakes 33309-4301

Lewis Middle School
Valparaiso 32580-1554

Madison Middle School
Titusville 32796-1598

McMillan Middle School
Miami 33183-1202

Merritt Island Senior High School
Merritt Island 32953-3199

New Beginnings—Naples
Naples 34104-4457

Seabreeze Senior High School
Daytona Beach 32118-3115

Southern Oaks Middle School
Port Saint Lucie 34983

Southwest Middle School
Lakeland 33803-3737

St Mark's Episcopal School
Fort Lauderdale 33334-5239

Winter Haven Senior High School
Winter Haven 33880-3737

Yulee Middle School
Yulee 32097

GEORGIA

Davidson Magnet School
Augusta 30901-2130

John Milledge Academy
Milledgeville 31061-7735

Appendix 2. Schools Participating in Norming the *TEK* (Continued)

Osborne High School
Marietta 30060-7338

Osborne Middle School
Hoschton 30548

Rising Starr Middle School
Fayetteville 30215

The Westminster Schools
Atlanta 30327-2428

Westside High School
Augusta 30907-3136

HAWAII

Olomana High & Intermediate School
Kailua 96734-4302

ILLINOIS

Ariel Elementary Community Academy
Chicago 60653-4403

Bethesda Lutheran School
Chicago 60645-4607

Brother Rice High School
Chicago 60655-3356

Central Catholic High School
Bloomington 61704-2534

Chicago High School for Agricultural Sciences
Chicago 60655-4009

Creston Elementary
Creston 60113-0037

Da Vinci Academy
Elgin 60123-8519

Ericson Elementary Scholastic Academy
Chicago 60624-3162

Frances Xavier Warde Schools
Chicago 60661-3512

Freeport High School
Freeport 61032-4999

Graham Elementary
Naperville 60564-4319

Hickory Creek Middle School
Frankfort 60423-9786

John Hancock High School
Chicago 60629-4442

La Moille High School
La Moille 61330-0440

Lowpoint-Washburn Junior-Senior High School
Washburn 61570-0580

Schreiber Home Discipleship
Elk Grove Village 60007

St Agatha Elementary
New Athens 62264

St Angela Elementary
Chicago 60651-1108

St Cletus Elementary
La Grange 60525-6612

St Hyacinth Elementary
Chicago 60618

Steinmetz Academic Centre High School
Chicago 60634-4041

Taft High School
Chicago 60631-3199

Timothy Christian High School
Elmhurst 60126-5263

Walt Disney Magnet School
Chicago 60613-2311

INDIANA

Brownsburg Junior High School
Brownsburg 46112-8041

Calvary Lutheran
Indianapolis 46227-4879

Riverside School
Fishers 46038

St Luke Elementary
Indianapolis 46260-3621

Tuttle Middle School
Crawfordsville 47933-3498

Western Boone Junior-Senior High School
Thorntown 46071-9229

KANSAS

Andale Elementary-Middle School
Andale 67001

Andale High School
Andale 67001

KENTUCKY

Mayfield High School
Mayfield 42066-2860

MICHIGAN

Williamston Middle School
Williamston 48895-1076

MINNESOTA

Adrian High School
Adrian 56110-0040

Saint Francis High School
Saint Francis 55070-8723

South View Middle School
Edina 55424-1597

MISSISSIPPI

Bay Waveland Middle School
Bay Saint Louis 39520

Mendenhall Junior High School
Mendenhall 39114-3733

MISSOURI

Benton High School
Saint Joseph 64504-1708

Brookfield High School
Brookfield 64628-2731

Chillicothe High School
Chillicothe 64601-3625

Northeast Nodaway High School
Ravenwood 64479-0206

Owensville Middle School
Owensville 65066-0536

NEBRASKA

Pound Middle School
Lincoln 68516-1799

R. M. Marrs Middle School
Omaha 68107-3699

NEVADA

K. O. Knudson Middle School
Las Vegas 89104-4106

NEW JERSEY

Mount Saint Mary Academy
Watchung 07069

Appendix 2. Schools Participating in Norming the *TEK* (Continued)

NORTH CAROLINA

Gates County Senior High School
Gatesville 27938-9438

Madison Middle School
Marshall 28753-9455

Providence High School
Charlotte 28270-0330

OHIO

Clear Fork Middle School
Bellville 44813-1229

Fairbanks High School
Milford Center 43045-9764

Stow-Munroe Falls High School
Stow 44224-3644

OKLAHOMA

Wyandotte High School
Wyandotte 74370-0360

PENNSYLVANIA

Our Mother of Perpetual Help
Ephrata 17522-1737

Radnor High School
Radnor 19087-5298

St Gabriel Elementary
Norwood 19074

Warwick High School
Lititz 17543-1814

Warwick Middle School
Lititz 17543-1425

RHODE ISLAND

North Providence High School
North Providence 02904

SOUTH CAROLINA

Blue Ridge Middle School
Greer 29651

Hand Middle School
Columbia 29205-2315

Springfield Middle School
Fort Mill 29715

St Michael Catholic School
Garden City 29576-8739

Woodmont High School
Piedmont 29673-9394

TENNESSEE

Cornersville School
Cornersville 37047

East High School
(Enrichment Academy)
Memphis 38111-3502

TEXAS

Meridian High School
Meridian 76665-0349

Refugio Middle School
Refugio 78377-3420

VIRGINIA

Mercer Middle School
Aldie 20105

WISCONSIN

Brookfield Central High School
Brookfield 53005-5138

Clara Mohammed School
Milwaukee 53212

East High School
Madison 53704-5295

Kickapoo High School
Viola 54664-9713

McKinley Middle School
Kenosha 53144-4105

Pewaukee Middle School
Pewaukee 53072-3630

Pulaski High School
Pulaski 54162-9516

Saint Croix Middle School
Hammond 54015-0118

St John The Baptist School
Green Bay 54313-6821

Wautoma High School
Wautoma 54982-0870

Appendix 3. Voluntary National Content Standards in Economics

1. Productive resources are limited. Therefore, people can not have all the goods and services they want; as a result, they must choose some things and give up others.

2. Effective decision making requires comparing the additional costs of alternatives with the additional benefits. Most choices involve doing a little more or a little less of something: few choices are "all or nothing" decisions.

3. Different methods can be used to allocate goods and services. People acting individually or collectively must choose which methods to use to allocate different kinds of goods and services.

4. People usually respond predictably to positive and negative incentives.

5. Voluntary exchange occurs only when all participating parties expect to gain. This is true for trade among individuals or organizations within a nation, and among individuals or organizations in different nations.

6. When individuals, regions, and nations specialize in what they can produce at the lowest cost and then trade with others, both production and consumption increase.

7. A market exists when buyers and sellers interact. This interaction determines market prices and thereby allocates scarce goods and services.

8. Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives.

9. Competition among sellers usually lowers costs and prices, and encourages producers to produce what consumers are willing and able to buy. Competition among buyers increases prices and allocates goods and services to those people who are willing and able to pay the most for them.

10. Institutions evolve and are created to help individuals and groups accomplish their goals. Banks, labor unions, markets, corporations, legal systems, and not-for-profit organizations are examples of important institutions. A different kind of institution, clearly defined and enforced property rights, is essential to a market economy.

11. Money makes it easier to trade, borrow, save, invest, and compare the value of goods and services. The amount of money in the economy affects the overall price level. Inflation is an increase in the overall price level that reduces the value of money.

12. Interest rates, adjusted for inflation, rise and fall to balance the amount saved with the amount borrowed, which affects the allocation of scarce resources between present and future uses.

13. Income for most people is determined by the market value of the productive resources they sell. What workers earn depends, primarily, on the market value of what they produce.

14. Entrepreneurs take on the calculated risk of starting new businesses, either by embarking on new ventures similar to existing ones or by introducing new innovations. Entrepreneurial innovation is an important source of economic growth.

15. Investment in factories, machinery, new technology, and in the health, education, and training of people stimulates economic growth and can raise future standards of living.

16. There is an economic role for government in a market economy whenever the benefits of a government policy outweigh its costs. Governments often provide for national defense, address environmental concerns, define and protect property rights, and attempt to make markets more competitive. Most government policies also have direct or indirect effects on people's income.

17. Costs of government policies sometimes exceed benefits. This may occur because of incentives facing voters, government officials, and government employees, because of actions by special interest groups that can impose costs on the general public, or because social goals other than economic efficiency are being pursued.

18. Fluctuations in a nation's overall levels of income, employment, and prices are determined by the interaction of spending and production decisions made by all households, firms, government agencies, and others in the economy. Recessions occur when overall levels of income and employment decline.

19. Unemployment imposes costs on individuals and the overall economy. Inflation, both expected and unexpected, also imposes costs on individuals and the overall economy. Unemployment increases during recessions and decreases during recoveries.

20. Federal government budgetary policy and the Federal Reserve System's monetary policy influence the overall levels of employment, output, and prices.

Source: CEE (2010).

Appendix 4. Answer Form and Scoring Keys, *Test of Economic Knowledge* (Second Edition)

Answer Form

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	○	○	○	**11**	○	○	○	○	**21**	○	○	○	○	**31**	○	○	○	○
2	○	○	○	○	**12**	○	○	○	○	**22**	○	○	○	○	**32**	○	○	○	○
3	○	○	○	○	**13**	○	○	○	○	**23**	○	○	○	○	**33**	○	○	○	○
4	○	○	○	○	**14**	○	○	○	○	**24**	○	○	○	○	**34**	○	○	○	○
5	○	○	○	○	**15**	○	○	○	○	**25**	○	○	○	○	**35**	○	○	○	○
6	○	○	○	○	**16**	○	○	○	○	**26**	○	○	○	○	**36**	○	○	○	○
7	○	○	○	○	**17**	○	○	○	○	**27**	○	○	○	○	**37**	○	○	○	○
8	○	○	○	○	**18**	○	○	○	○	**28**	○	○	○	○	**38**	○	○	○	○
9	○	○	○	○	**19**	○	○	○	○	**29**	○	○	○	○	**39**	○	○	○	○
10	○	○	○	○	**20**	○	○	○	○	**30**	○	○	○	○	**40**	○	○	○	○

_____ RAW SCORE

_____ PERCENTILE SCORE

NAME _____ DATE _____
month day year

AGE _____ DATE OF BIRTH _____ SEX M F
month day year (circle one)

SCHOOL OR TEST CENTER _____

ADDRESS _____
number and street city state zip

INSTRUCTOR _____ GRADE OR YEAR _____ SEMESTER _____

Appendix 4. Answer Form and Scoring Keys, *Test of Economic Knowledge* (Second Edition) (Continued)

Scoring Key, TEK-A

	A	B	C	D
1	○	○	○	●
2	○	○	●	○
3	○	○	●	○
4	○	○	○	●
5	○	●	○	○
6	●	○	○	○
7	○	●	○	○
8	○	○	●	○
9	●	○	○	○
10	○	●	○	○
11	○	●	○	○
12	○	●	○	○
13	●	○	○	○
14	○	●	○	○
15	○	○	○	●
16	○	○	○	●
17	●	○	○	○
18	●	○	○	○
19	○	●	○	○
20	●	○	○	○
21	○	○	○	●
22	○	○	●	○
23	●	○	○	○
24	○	○	○	●
25	○	○	○	●
26	○	○	●	○
27	○	○	●	○
28	○	●	○	○
29	○	○	○	●
30	○	○	●	○
31	○	○	○	●
32	○	●	○	○
33	○	○	○	●
34	○	○	●	○
35	●	○	○	○
36	○	○	●	○
37	○	●	○	○
38	○	○	●	○
39	●	○	○	○
40	●	○	○	○

Appendix 4. Answer Form and Scoring Keys, *Test of Economic Knowledge* (Second Edition) (Continued)

Scoring Key, TEK-B

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	●	○	○	**11**	○	○	●	○	**21**	○	○	●	○	**31**	○	○	○	●
2	○	○	●	○	**12**	●	○	○	○	**22**	○	○	○	●	**32**	○	●	○	○
3	○	○	●	○	**13**	●	○	○	○	**23**	●	○	○	○	**33**	●	○	○	○
4	○	○	○	●	**14**	○	●	○	○	**24**	○	○	○	●	**34**	○	○	●	○
5	○	○	●	○	**15**	○	○	○	●	**25**	○	○	○	●	**35**	●	○	○	○
6	○	●	○	○	**16**	○	●	○	○	**26**	○	○	●	○	**36**	○	○	●	○
7	●	○	○	○	**17**	●	○	○	○	**27**	○	●	○	○	**37**	●	○	○	○
8	○	○	●	○	**18**	○	○	○	●	**28**	●	○	○	○	**38**	○	●	○	○
9	●	○	○	○	**19**	○	○	○	●	**29**	○	○	○	●	**39**	○	●	○	○
10	○	●	○	○	**20**	○	○	●	○	**30**	○	○	○	●	**40**	○	●	○	○

NOTES