

Instructor's Manual

For

Basic Materials in Music Theory

A Programed Course

Thirteenth Edition

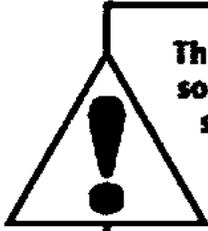
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Musical examples completed in *NoteWriter™*, *NoteAbility Pro™*, and *Finale 2009™*
Pages completed in *Ready, Set, Go!™*

Introduction

This manual has been prepared to assist instructors in the use of *Basic Materials in Music Theory: A Programmed Course*, Thirteenth Edition. The chapters contained in this volume are correlated with those of the text, and each contains four sections: (1) *Main Points and Objectives*; (2) *Alternative Approaches and Supplementary Activities*; (3) *Classroom Aids*; and (4) *Answers to Supplementary Assignments and Quiz Masters*.

The method of programmed instruction employed in the text has proved to be effective in a wide variety of educational situations. Because programmed instruction provides constant feedback, it is largely self-tutorial. Thus, the text is especially effective in large classes, where attention to individual needs is necessarily limited. The text is also effective when used by individuals working largely on their own. In normal class situations, instructors are relieved from much routine teaching and time-consuming paper grading. So, instructors are free to design alternate learning experiences, such as creative work, ear training, or the study of music literature and form. The efficiency of programmed instruction provides the time for such experiences; the suggestions and material contained in this manual help supply the means. With such help, instructors may enrich their course in various ways. Fuller comprehension and more rewarding educational experiences should be the result.

The text incorporates two methods for students to reinforce their learning: (1) each chapter contains a series of mastery frames, by means of which students may assess their comprehension of the key points that have been presented; and (2) supplementary assignments that provide additional reinforcement. The assignments also provide a means for the instructor to monitor student progress towards mastering the subject matter. The material contained in this manual provides the answers to the supplementary assignments and quiz masters. To simplify the evaluation of student responses, the answers are generally presented in the same format as the assignments. In some cases, responses need not be exactly as given. Alternative solutions are often possible, for example, where enharmonic spellings are involved. Common sense should be applied in such cases.

Although the chapters of *Basic Materials in Music Theory* have been arranged to provide an orderly sequence of material, instructors should feel free to alter the order if they wish. Some instructors, for example, prefer to base the study of intervals on the major scale, so taking Chapter 8.0, *The Major Scale*, before Chapter 6.0, *Intervals*, may be preferred. Each chapter is relatively self-contained, but if the order of chapters is changed, some explanation in class may be necessary.

The emphasis in *Basic Materials in Music Theory* is on written theory. Aural experiences are vital, however, so students should be encouraged to use the “Ear-Training Activities” that appear at the end of each chapter of the text and to also continue, or certainly start, any ear-training exercises they can in melodic and rhythmic dictation, sight singing and general music listening. This edition offers recorded examples of how a student might practice and work with the Ear-Training Activities’ suggestions. Students should be strongly encouraged to utilize these examples with the text. Students should also be encouraged to invent exercises on their own and to explore all kinds of music literature through their particular performance medium. Such activities can be tied to explorations of the creative process. In any case, the goal is to help students to become more sensitive to all aspects of sound, as well as their own reactions to various sound stimuli. Such self-awareness can provide an avenue to more mature musicianship.

The material in this manual is presented in four sections for each chapter. The manner in which the information contained in these sections may be used is detailed below:

1. *Main Points and Objectives*

This section summarizes in outline form the principal items of information that are needed for mastery of the subject matter. These generally are listed in the order in which they occur in the text. Instructors should find this information helpful in preparing supplementary lectures, demonstrations, and drills to reinforce in class the individual work done by the student. This section also identifies the skills that constitute the objectives toward which the learning experiences are aimed.

2. *Alternative Approaches and Supplementary Activities*

Suggestions are given to help instructors supplement the text with additional material and related activities. Advice is also given regarding various ways to use the text, including the reordering of chapters.

3. *Classroom Aids*

A set of PDF masters is provided for each chapter. The pages of this manual may also be used to make masters for use in class. The PDF masters can be placed into a computer presentation program such as Power Point™, Keynote™, or a PDF reader.

Instructors who have not used computer projector are encouraged to try this technique. Its advantages include the following:

- a. Use of the projector usually does not require that the room be darkened.
- b. Masters may be prepared in advance and used with the projector as needed. This avoids the time-consuming job of writing material on a chalk or white board.
- d. A series of overlays may be prepared to trace a sequence of steps to solve a problem or to demonstrate a particular process.

Instructors are encouraged to prepare other examples to supplement the masters that are provided. To facilitate this, the *Appendix* contains blank masters that may be duplicated for the preparation of additional prepared exercises, or made into a master without additional writing. Masters can also be prepared on a computer (as indeed this whole manual was prepared) utilizing one of the many programs now available for this purpose. Further, masters could be prepared for other short exercises or examples from the many musical materials available. If this is done, proper copyright notice should be placed on the master, or the source should be acknowledged. (Please see the Reference Bibliography in the *Basic Materials in Music Theory* text for further information.)

4. *Answers to Supplementary Assignments and Quiz Masters*

The information in this section is provided to facilitate the correction of Supplementary Assignments and the Quiz Masters.

Chapter 1.0

The Basic Materials of Music: Time and Sound

MAIN POINTS AND OBJECTIVES

It is desirable that serious study of music should begin with the establishment of a perspective that includes the following points:

1. There are two sides to music, the emotional and the rational.
2. Music is a temporal art that involves patterns of sound.
3. The two basic materials of music are time and sound.

To understand music, one must comprehend the manner in which both time and sound are organized. The purpose of this chapter is to present the four properties of sound: pitch, intensity, timbre, and duration. This is done in terms of simple acoustical phenomena.

Main points covered:

1. Sound source: vibrating body
2. Sound waves
3. Pitch
4. Frequency
5. Octave phenomenon
6. Amplitude
7. Intensity
8. Timbre
9. Natural harmonic series
10. Partials
11. Fundamentals
12. Overtones
13. Duration

ALTERNATIVE APPROACHES AND SUPPLEMENTARY ACTIVITIES

Each of the properties of sound should be demonstrated in class to provide students with actual aural experiences. The piano is perhaps the most useful tool and can be employed to demonstrate the natural harmonic series. Harmonics, through about the 6th harmonic, can be demonstrated singly by depressing silently the key that plays each successive harmonic (partials 2, 3, 4, etc.), then playing rather forcefully the fundamental. Sympathetic vibrations will cause the harmonic to sound, although with decreasing volume as higher harmonics are demonstrated. Brass or stringed instruments are also effective in demonstrating the natural harmonic series.

Information about the acoustics of music can stimulate student interest, and cultivate keener awareness of how sound is generated and perceived. Some instructors may wish to expand the material presented in Chapter 1.0. The books cited below are recommended as being useful for this purpose.

- Backus, John. *Acoustical Foundations of Music*. 2nd. ed. 1977. New York: W.W. Norton.
- Benade, A.H. *Fundamentals of Musical Acoustics*. 2nd rev. ed. 1990. Mineola, N.Y.: Dover Publications, Inc.
- _____. *Horns, Strings & Harmony*. 1992. Mineola, N.Y.: Dover Publications, Inc.
- Bienvenue, Gordon F. & Prout, James H. *Acoustics for You*. 1990. Malabar, Fla.: R.E. Krieger Pub. Co.
- Campbell, D.W. & Greated, Clive A. *The Musicians Guide to Acoustics*. 1987. New York: Schirmer Books.
- Hall, Donald. *Musical Acoustics: An Introduction*. 1980. Belmont, Calif.: Wadsworth Publishing Co.
- Moravcsik, Michael J. *Musical Sound: An Introduction to the Physics of Music*. 1987. New York: Paragon House.
- Pierce, John R. *The Science of Musical Sound*. 1983. New York: W.H. Freeman.
- Slawson, Wayne. *Sound Color*. 1985. Berkeley, Calif.: University of California Press.
- Wagner, Michael J. *Introductory Musical Acoustics*. 3rd ed. 1994. Raleigh, N.C.: Contemporary Publishing Company.

Additional supplementary activities include the following:

1. Please refer to page 12 in the text for a listing of Supplementary Activities. These activities, in turn, can be enhanced by the activities suggested in this listing.
2. An electronic studio is ideal for the audible demonstration of various acoustical phenomena, including not only the basic properties of sound, but also beats, combination tones, wave forms, etc.
A helpful web site: <http://www.phys.unsw.edu.au/jw/basics.html>
3. Films, video tapes, or DVDs shown in class provide an added dimension to the learning experience; such activities generally stimulate increased interest in the subject. The films below are recommended; other films, video tapes, or DVDs may also be available through other sources not currently known to the author.

Sound Waves and Their Sources (second edition), 10 minutes, black and white, on rental. Explains that all sound originates in vibrating objects and illustrates the three general types of vibrating sound sources: columns of air, surfaces, and strings and rods. Describes the major characteristics of sound waves: pitch, loudness, and timbre. Demonstrates the principle auditory differences between sounds. (Note: This film is now out of print and may only be sporadically available from a film rental library.)

Sounds and How They Travel, 11 minutes, color, on rental. Illustrates the mechanics involved in the transmission, reflection, and absorption of sound in air. Uses animation to visualize the compression and expansion of air molecules in the formation of sound waves, the special vibrating movement of air molecules in transmitting sound waves, and the reflection of sound in the formation of echoes.

Sounds Around Us (Discovering Matter and Energy), 10 minutes, color, on rental. Shows that sound is produced by something vibrating and pictures various ways in which vibrations are caused. Explains what causes sound to differ in pitch, intensity and timbre.

The last two films may be rented from the source below:
University of Illinois Film Center
1325 South Oak Street
Champaign, Illinois 61820

4. The “Ear-Training Activities” placed at the end of each chapter of the text are intended for use by students working alone. They may, however, be used in class as a supplement to other aural training. In any case, students should be encouraged to experiment with their own instrument or voice as well as to experience and become increasingly sensitive to sound phenomena. If time allows, interactively demonstrate the “Ear-Training Activities” in class.

CLASSROOM AIDS

Masters 1.1A–1.2B are for supplementary classroom presentations, drills, and a quiz related to the material contained in Chapter 1.0. Masters for this and all following chapters, may be removed in order to produce masters for use with a projector. For easy identification, each master is coded to indicate the chapter and sequence. The code (1.1A, 1.1B, *etc.*), for example, is interpreted as Chapter 1.0, first master set, consisting of several pages.

NOTE: Starting with this chapter and beyond, it would be possible to also make projection masters of the Supplementary Assignments to use as reviews, in-class drill, or as quiz material.

MASTER 1.1A

Match terms on the right with those on left.

A. Vibrating body ___ 1. Energy of sound waves

B. Sound waves ___ 2. Harmonics

C. Amplitude ___ 3. Vibrational disturbances

D. Frequency ___ 4. Doubled frequency rate

E. Fundamental ___ 5. Pitch

F. Octave ___ 6. First partial

G. Timbre ___ 7. Sound source

MASTER 1.1B

Match terms on the right with those on left.

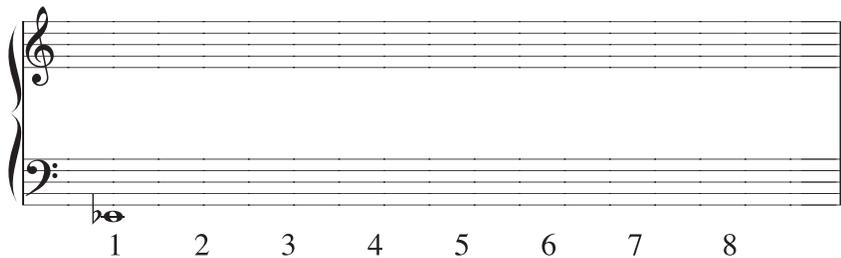
A. Vibrating body ___ 1. Energy of sound waves

B. Sound waves ___ 2. Harmonics

C. Amplitude ___ 3. Vibrational disturbances

D. Frequency ___ 4. Doubled frequency rate

Write natural harmonic series on E \flat



MASTER 1.2A

QUIZ

1. PITCH is primarily a matter of (1) time; (2) sound.
2. INTENSITY can be measured by its (1) overtone series; (2) timbre; (3) amplitude.
3. TIMBRE is concerned with various mixtures of (1) frequencies; (2) pitches; (3) harmonics or partials; (4) rhythms.
4. SOUND WAVES are transmitted by _____ .
5. The "length" of tones refers to the basic material of music called _____.

MASTER 1.2B

6. The frequency of a tone two octaves lower than another is (1) one-half; (2) one-fourth; (3) half again; (4) double; (5) four times the frequency of the latter.

7. The lowest partial is called the (1) first overtone; (2) harmonic; (3) fundamental.

8. A 2:1 frequency ratio refers to a(n) (1) third; (2) fourth; (3) sixth; (4) octave.

9. The NATURAL HARMONIC SERIES is a(n) (1) group of harmonies; (2) complex of pitches; (3) harmonic progression.

10. Write a natural harmonic series on "G" on the bottom of your answer sheet on the grand staff.

ANSWERS TO SUPPLEMENTARY ASSIGNMENTS

ASSIGNMENT 1-1

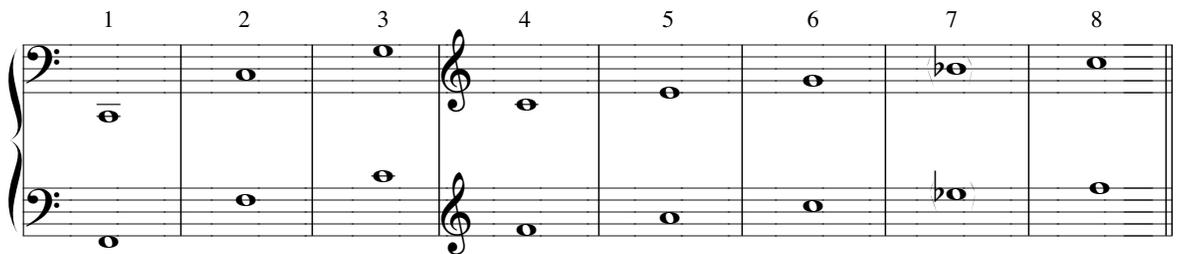
1. acoustics
2. sound waves
3. vibrating
4. a. strings; b. columns of air; c. wooden bars; d. metal plates
5. Pitch
6. Frequency
7. The frequency of a tone is 100 cycles per second.
8. *Frequency*

$$\frac{1,760}{2} = 880$$

$$\frac{880}{2} = 440$$

$$\frac{440}{2} = 220$$

$$\frac{220}{2} = 110$$
9. Intensity
10. Intensity (volume) diminishes as the distance increases.
11. partials
12. The quality of sound.
- 13.



- | | | |
|-----|------|-------|
| 14. | 1. F | 7. D |
| | 2. E | 8. A |
| | 3. K | 9. G |
| | 4. B | 10. H |
| | 5. I | 11. C |
| | 6. J | |

15. duration
16. a.
17. octave

ANSWERS TO QUIZ MASTERS

MASTERS 1.2AB

- | | |
|---------------------|--|
| 1. 2 | 6. 2 |
| 2. 3 | 7. 3 |
| 3. 3 | 8. 4 |
| 4. vibrating bodies | 9. 2 |
| 5. duration | 10. (harmonic series on G; cf. no. 13 in Supplementary Assignment 1-1) |

Chapter 2.0

The Notation of Pitch

MAIN POINTS AND OBJECTIVES

The objective of this chapter is to be able to identify, write, and interpret correctly the various signs that indicate pitch.

Main points covered:

1. Staff
2. Treble, bass, and C-clefs
3. Names of notes on the various lines and spaces
4. Ledger lines
5. Grand staff
6. *Ottava* sign
7. Half and whole steps
8. Accidentals
9. Bar lines
10. Enharmonic notes
11. Chromatic scale
12. Octave designations

ALTERNATIVE APPROACHES AND SUPPLEMENTARY ACTIVITIES

For most beginning students, it may be desirable to stress the treble and bass clefs, with the alto and tenor clefs introduced for information only. Knowledge of the C-clefs, however, is needed as preparation for orchestral score reading, composition, or the study of music history and literature involving the original notation of Renaissance or Baroque music.

The terminology of octave designations may be stressed to a greater or lesser extent as the instructor sees fit. The need for precise identification of pitches is perhaps greatest in the fields of composition, orchestration and acoustics.

Stress should be placed upon the fact that, in spite of appearances, not all adjacent notes on the staff produce the same interval. There is a half step between the notes E–F and B–C. All other adjacent notes produce whole steps.

Aural experience at this point is very helpful. Students should play the basic notes at a keyboard to visualize and hear the difference between half and whole steps (a black key separates two white keys that produce a whole step; there is no black key between two white keys that produce a half step.) The chromatic scale should be played and sung. Also review with students how to work with the ear-training activities by practicing some or all of them in class.

Please also see Supplementary Activities listed on page 52 in the text.

CLASSROOM AIDS

Masters 2.1A–2.2B are for supplementary classroom presentations, drills, and a quiz related to the material contained in Chapter 2.0.