

learning element



CONUNDRUMS

EPS500 fall 2008 & 2010 J. Ryan Rimington

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Canonic Conundrums is a learning unit designed for a non-auditioned high school, curricular choral ensemble/course containing students grades 10-12 representing diverse musical experience levels. The primary goals of the unit are as follows:

- Explore and differentiate types and components of canons within varied types and styles of musical literature
- Present performance repertoire incorporating canon
- Compose, rehearse, and perform original canons
- Research, explore, and gain and understanding of ways in which canonic concepts are manifested in other art forms, science, mathematics, and nature.

The learning unit has been planned and documented using the Learning by Design method. The subsequent pages describing the unit are presented as follows:

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- 1) Placemat Overview of the Unit
- 2) Detailed Post-it Note Planning of the 4 LbD areas: Experiencing, Conceptualizing, Analyzing, Applying
- 3) Notated Examples of Possible Canons to be performed in the unit
- 4) 1st Page of Performance Repertoire to be used in the unit
- 5) CD Compilation Track List of aural examples to be used in the unit
- 6) General Teaching notes to be used in the unit

the known EXPER	IENCING the new	appropriately APPLY	YING creatively
1. Sing common canons/rounds 11. Review sight-singing/music reading strategies 18. Discuss and review "new repertoire" approaches ar strategies 26. Use large rehearsal strategies and routines in small ensemble rehearsals of canon compositions 32. Student perform prepared repertoire in public performance 38. Report on ways in which canon is used in other art forms	22. Listen to complex forms of canon 27. Students lead small ensemble rehearsals of original c compositions 22. Compositions	25. Create and notate canon compositions based upon ker forms and characteristics of comples canons 36. Construct a plan for improving any performance difficiencies for the next learning unit 37. Summarize the role of canon in musical literature	applied in other art forms
by naming CONCEPTUAL	CANON CONUND OVERVIO		YZING critically 7. Analyze and judge effects of types of canon
3. Define canon and its components4. Define and contrast types of canons	Read notated canons and anticipate aural effects Hypothesize alterations to newly learned canons	14. Assess the causes of effects of canonic alteration	
21. Identify and differentiate complex forms of canon	23. Develop "elements of canon" listening checklist	20. Identify and discuss ways in which known can	on 10. Write a musical review of researched examples
28. Students identify, describe, perform and present the original canon compositions	e#0. Define and explain the ways in which musical canon	concepts are utilized in concert repertoire	of canon 16. Assess the effectiveness of small ensemble
original canon compositions	concepts are manifested in other areas	Apply listening checklist to listening examples Section 29. As audience members, students use the listening checklist to compare and contrast the original compositions	canon compositions
を所。 ルなり なった 5日か	です: x h x まい x y x h x i x y x i x y x i x y x i x y x i x y x i x y x i x y x i x y x i x i	34. Discuss the effectiveness (or lack thereof) of the canon repertoire in performance 41. Deduce the reasons why canon is utilized in ot areas	43. Complete the learning element evaluation form

1. In the large choral ensemble, choral ensemble, students will sing students canons and familiar canons Row, rounds such as Row, Row, Row You Boat, Row, Row Jacques, etc. Frère Jacques, etc.

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18. Students will discuss and review approaches and strategies for initial reading of choral repertoire.

32. Students
perform prepared
performance
repertoire
incorporating canon
in a public
performance
(featuring student
program notes).

26. Students liar 26. Students liar property from the property of the property

38. In a class discussion, students recap their ideas as to the ways in which canon is used in other art forms.

2. Embedded into daily rehearsals and class periods, the entire large ensemble will listen to simple, unfamiliar cannons and rounds

9. Students will be led to search for and present recorded examples of canon from their own musical collection on the class website.

12. The large choral ensembles will read through and sing new canons. (See "notated canons")

19. Large ensembles rehearsals will begin to focus on concert repertoire that incorporates canon.

27. Students lead independent small ensemble rehearsals of original canon compositions.

39. Students are introduced to complex forms of canon in other art forms, applications of science, and in the realm of mathematics.

22. Embedded into
daily rehearsals and
class periods,
class large
entire large
entermble will listen
ensemble forms of
to complex form of
to anons from of
canons historical
varied historical
periods and genres.

33. Students listen to audio recordings of their concert performance.

3. Through teacherled instruction and reinforced with reinforced learning printed learning element materials, elements will define students will define canon and its components.

4. Through teacherled instruction and
reinforced with
printed learning
element materials,
students will define,
compare and
contrast simple
forms of canon.

21. Through class instruction and reinforced with printed learning element materials, students will define, compare and contrast complex forms of canon.

28. Students
28. Students
categorize, perform, describe, per their describe, and present canon original canon compositions.

5. Students will read notated canons without singing and dialogue about the anticipated aural effects. (see notated canons)

13. Students will be led to hypothesize as to ways to perform and alter newly learn canons. The ensemble will experiment with these suggestions in rehearsal.

23. Students will collaboratively develop an "elements checklist that will identify and evaluate canon in listening

40. Students will be guided to define and explain the ways in which musical canon concepts are manifested in other arts forms, science, and mathematics (i.e. Escher, Godel, DNA, etc.)

AA

т

14. Students will be led to assess and articulate the effectiveness, and causes-and-effects, of the canonic alterations and experiments in rehearsal.

29. As audience

checklist to

compare and

original canon

compositions.

members, students use the "elements of canon" listening

contrast their peers

6. In listening examples, students will be led to aurally identify, articulate, and dialogue regarding the components and descriptions of

20. Identify and discuss ways in which defined and known canon concepts are exemplified in proposed concert repertoire.

24. Students will complete three canon listening reports based upon recordings posted on the class website, using the elements of Canon" listening

34. Students discuss the effectiveness (of lack thereof) of the canon repertoire presented in their recent concert performance.

41. Via the class website, students blog and deduce ways in which canon naturally occurs in our world, and the reasons why people often choosé to incorporate canonic concepts in creative applications and explanations.

7. In listening examples, students will analyze and judge the effects of as compared canon, as compared to non-canonic genres.

8. Students will begin to articulate the reasons why composers use composers use canon, and the role Canon, and the rote various types of musical genres.

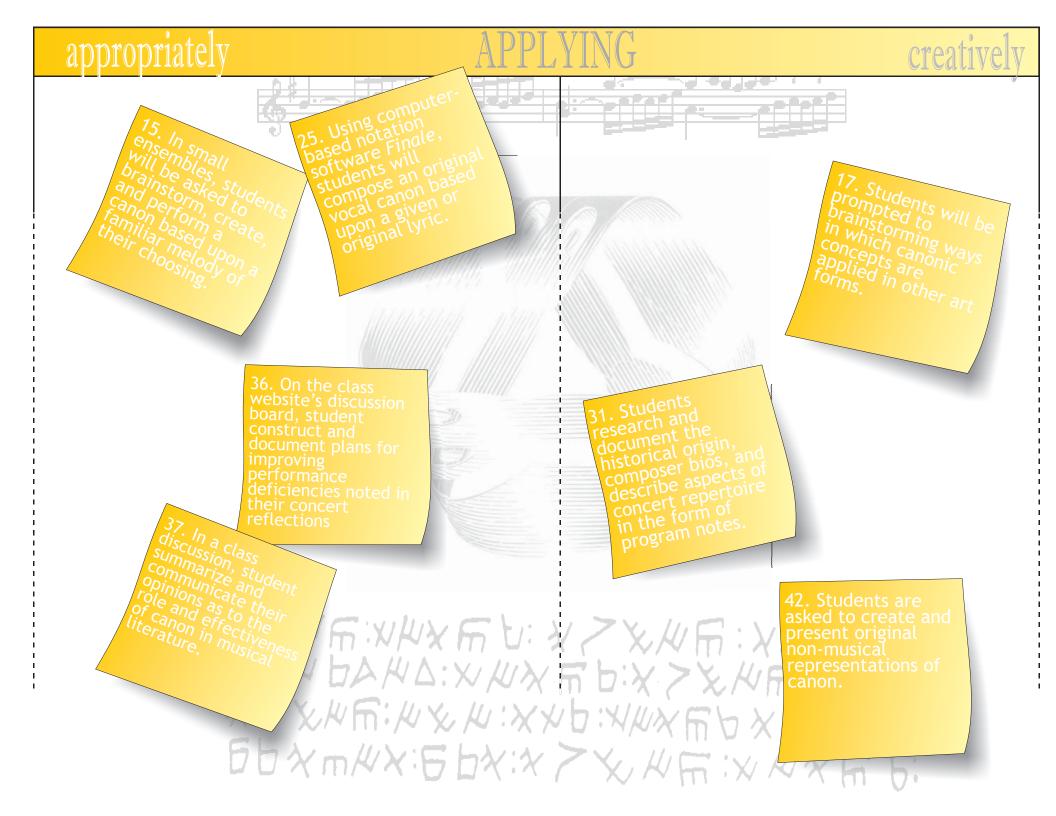
10: Students will write and post a "review" of one of researched posts of examples of canon on the class

16. Students will assess and evaluate the effectiveness of the small ensemble canon compositions in terms of the previously discussed formal and harmonic concepts.

30. Students selfassess the effectiveness of their canon compositions and performances by blogging reflections on the class website.

43. Students are asked to complete an anonymous learning element evaluation form which asks students to discuss their growth in content knowledge and musicality.

35. Using an on-line concert reflection form, students evaluate the quality of their public performance in terms of musicality, poise, preparation, and their own audience focus.







Notated Missa prolationum Sandus Juga pausarum ascendend per lextam anc tus Sanc tus lanc tus **D**o mi nus de us do mi nus de us la Fuga wit unum O per feptimam ba oth 3)le ni Cunt li et ter cæ ra glo Perfectum in c fol fa ut ri a tu O san na in excel sis o san in ex cel

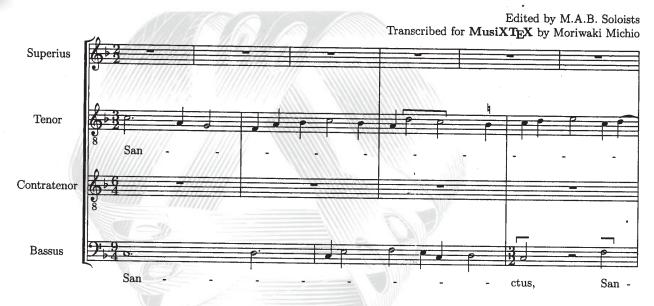
sis o san na in ex cel

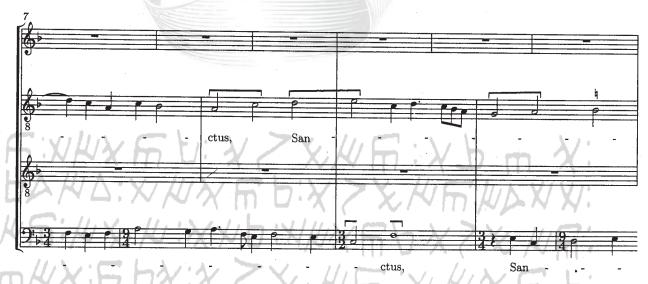
sis in er



Missa prolationum Sanctus

Johannes Ockeghem (c.1410 - 1497)





(Page 1 of 3. All pages will be distributed to the students. Page 1 is only shown here for example.)

Notated tus Sanc anc tus lanc tus Mo minus do minus De us De us Sa ba oth

Psan na in ex cel sis o san na in ex cel sis o san na in ex cel sis o san na in ex cel sis

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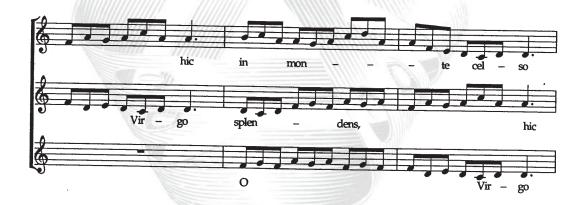


Good Friend



O Virgo Splendens





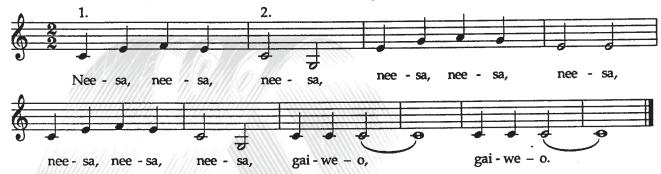


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Neesa

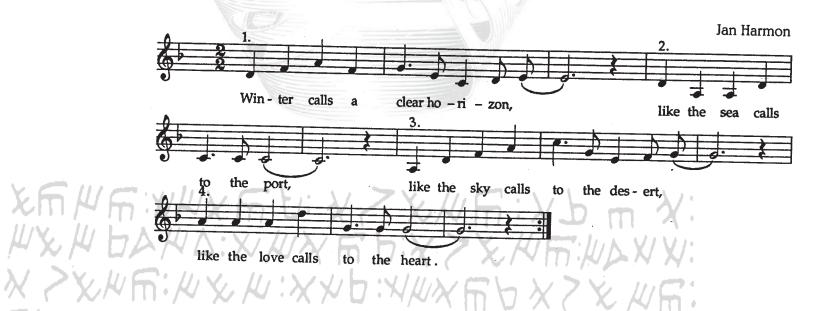
Native American

(Contemporary gift from the Seneca Indian Language)

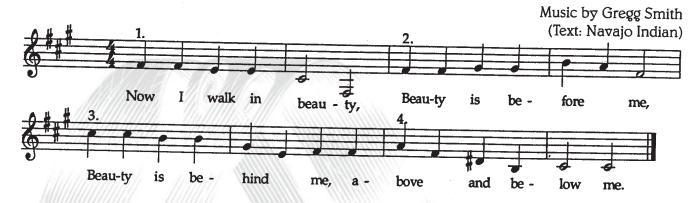


Clear Horizon

ロロタヨをといいロログ:タフグ、七日:メルタ



Now I Walk In Beauty



Lo Yisa Goy

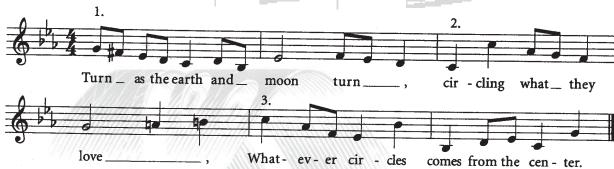
ロロタヨをといいないが、とのは、メをからで、



Whatever Circles Comes from the Center

Barbara Gayny Text: Jelaluddin Rumi (1207–1273)

Translation: Coleman Barks



1 Have a Million Nightingales

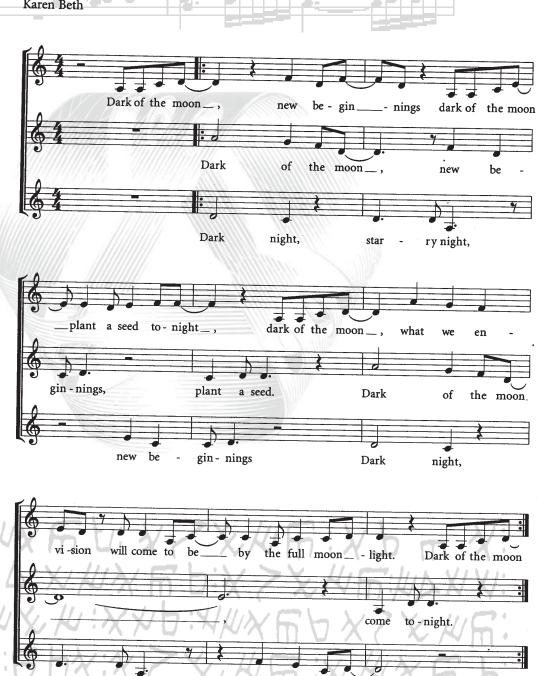
Linda Hirschhorn

Text adapted from the poetry of Mahmoud Darwish



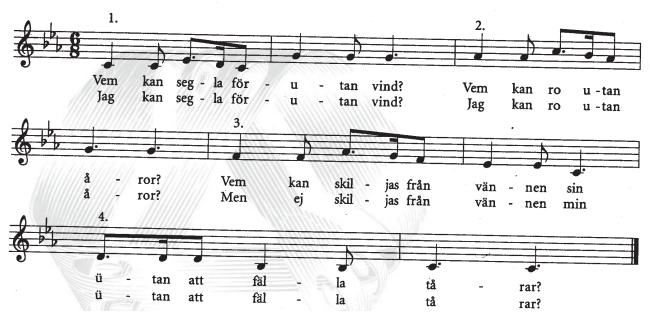
Dark of the Moon

Karen Beth



will come to

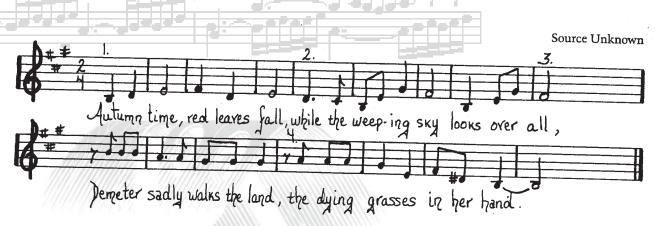
Vem Kan Segla
Sweden



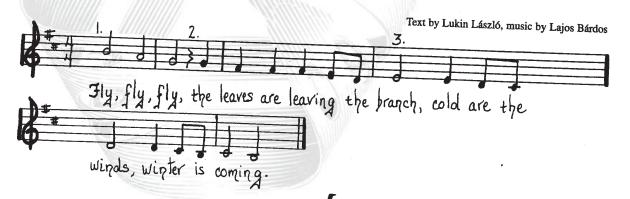
Ah, Comme C'est Chose Belle



Autumn Time



Fly, Fly, Fly





Full Moonlight Dance



Kore Chant



Young Rider



As I Mee Walked

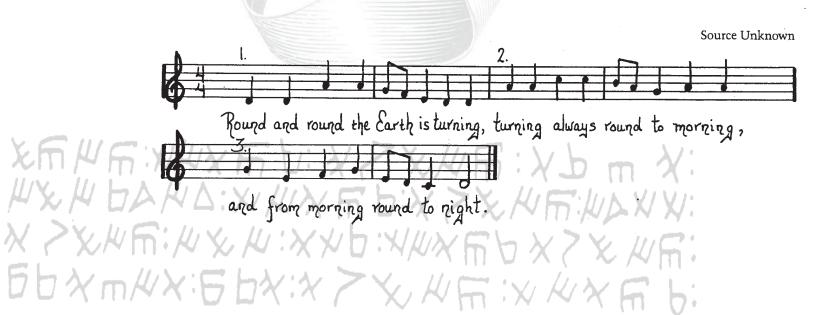


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Russian Lullaby



Round and Round



Dona nobis pacem



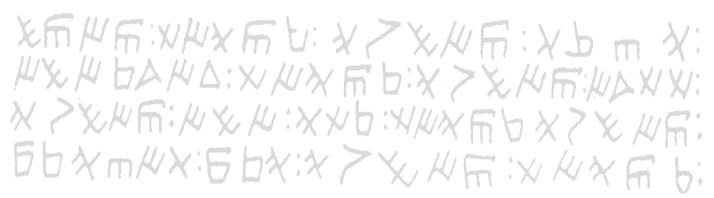


Version 2 Canon in two or three parts*

Lamentations V, 21

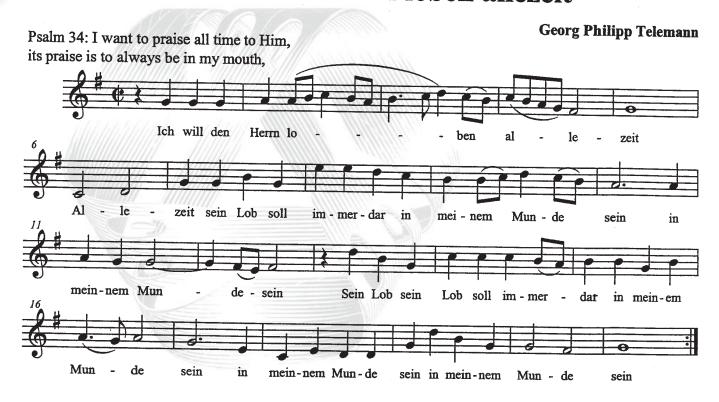
Israeli Folk Song







5 - 100 Ich will den Herrn loben allezeit







personmance Repertoire

for Alberta Swain Elliott

HOW CAN I KEEP FROM SINGING?



My end - less song, (Page 1 of 6. All pages will be distributed to the students. Page 1 is only shown here for example.)

life flows on

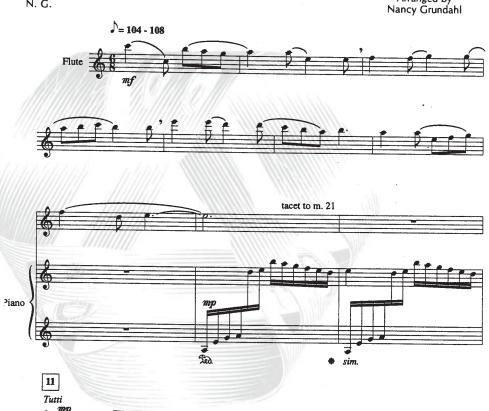
WINDS OF PEACE 17

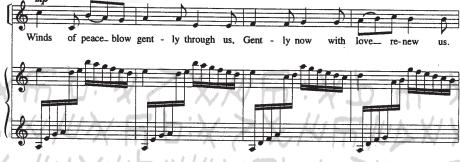
(Ruach, Ruach)
For Four-Part Treble Voices
with Flute and Piano Accompaniment

English Text by N. G.

Traditional Hebrew Round Arranged by Nancy Grundahl

3





Duration: ca. 4:00

personmance Repentaire

for the Glen Ellyn Children's Chorus, Lisa R. Sirvatka, Director

for Solo Voice & Three-Part Treble Voices, a cappella

Traditional Spiritual arranged by



(Page 1 of 6. All pages will be distributed to the students. Page 1 is only shown here for example.)

CD Recording
Recording
Track
List

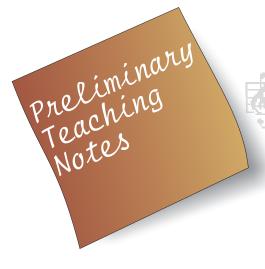
	Canon Learning Unit - CD1		
	- Dames	Companier Artist	
	Sumer is icumen in	Anon.	1:47
2	Canon and Gigue in D Major: I. Canon	Johann Pachelbel	4:32
3	String Quartet No. 6: III. Variations (on Pachelbel Canon)	George Rochberg	8:18
4	Canon in D (Pachebel)	Power Music Workout	4:30
5	Pachelbel: Canon in D Major	Jacques Loussier Trio (Jazz)	9:46
6	Row, Row Your Boat	The Baby Einstein Music Box Orchestra	1:36
7	Row, Row Your Boat	Kidz Klub Muzik	2:37
8	Frere Jacques	Raffi	1:07
9	Frère Jacques	Ray Berretto (jazz)	5:39
10	Felerlich Und Gemessen [Symphony No1 D Minor "Der Titan"]	Gustav Mahler	10:21
11	Goldberg Variations for keyboard, BWV 988: Variation 3 a 1 Canone All' Unisuono	Johann Sebastian Bach	:55
12	Goldberg Variations for keyboard, BWV 988: Variation 6 a 1 Canone alla Seconda	Johann Sebestian Bach	34
13	Goldberg Variations for keyboard, BWV 988: Variation 9 a 1 Canone alla Terza	Johann Sebastian Bach	:38
14	Goldberg Variations for keyboard, BWV 988: Variation 12 Canone alla Quarta	Johann Sebastian Bach	:56
15	Goldberg Variations for keyboard, BWV 988: Variation 15 a 1 Canone alla Quinta	Johann Sebastian Bach	2:17
16	Goldberg Variations for keyboard, BWV 988: Variation 18 - Canone Alle Sesta a 1	Johann Sebastian Bach	:46
17	Goldberg Variations for keyboard, BWV 988: Variation 21 Canone alla Settima	Johann Sebastian Bach	1:42
18	Goldberg Variations for keyboard, BWV 988: Variation 24 Canone All' Ottava a 1	Johann Sebestian Bach	:57
19	Goldberg Variations for keyboard, BWV 988: Variation 27 Canone alla Nona	Johann Sebastian Bach	:50
20	Musical Offering, BWV 1079: Canon Perpetuus	Johann Sebestian Bach	1:10
21	Musical Offering, BWV 1079: Canon a 2 Quaerendo invenietis	Johann Sebastian Bach	1:56
22	The Musical Offering: Canon 1 a 2: Canon cancrizans	Johann Sebestian Bach	:50

	Canon Learning		
Frack	tiame	Composer Artist	Time
1	Sym. #3: I. Lento—Sostenuto Tranquillo Ma Cantabile	Henryk Gorecki	2:47
2	Missa Prolationum - Sanctus	Johannes Ockeghem	3:29
3	Study No. 36	Conion Nancarrow	4:03
4 4	Four-Voice Canon #4	Larry Polansky	4:52
5	Four-Voice Canon #14, Kid Canon	Larry Polansky	1:41
6	Four-Voice Canon #17, Guitar Canon	Larry Polansky	4:22
7	Piano Phase (1967)	Steve Reich	20:37
8	Plano Phase (D*Note's Phased & Konfused Mitc)	D*Note	5:09
9	Clapping Music (1972)	Steve Reich	4:48
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CD conding Recording Track List

	Canon Learning Unit - CD3		
	tione	Composer 8th t	Limo
	Clapping Music Variations	Glenn Kotche	4:45
2	Me Fin Est Mon Commencement - Rondeau	Guillaume de Machaut	7:27
3	Supremum Est Mortalibus Bonum: Agnus Dei	G. Dufay	8:23
4	Hotaru Koi	Libena	1:15
5	Good Friemd	Libena	2:47
6	O Virgo Spendens	Libena	3:45
7	Neesa	Libana	1:55
8	Clear Horizon	Libana	3:44
9	Now I Walk in Beauty	Libana	2:26
10	Lo Yisa Goy	Libena	3:24
11	Whatever Circles Comes from the Center	Libana	2:16
12	Dark of the Moon	Libana	3:12
13	l Have a Million Nightingales	Libana	2:47
14	Vem Kan Segia	Libana	3:33
15	Ah, Comme C'est Chose Beile	Libana	2:20
16	Autumn Time	Libena	2:12
17	Fly, Fly, Fly	Libana	1:40
18	Lachen	Libena	1:15
19	Full Moonlight Dance	Libana	2:44
20	Kore Chent	Libana	2:48
21	Young Rider	Libana	1:50
22	As I Mee Walked	Libena	2:00
23	The Earth, the Air, the Fire, the Water	Libana	2:49
24	A Circle is Cast	Liberra	2:58
25	Russian Lullaby	Libana	3:23

Canon Learning Unit - CD4			
		Compruer Hitot	T me
1	Round and Round	Libana	2:15
2///	Dona Nobis Pacem	Rounds Galore and More Singers	3:52
3	Dona Nobis Pacem	InsideOut A cappella	2:42
4	Hashiyenu	Be-Attitude	6:45
5.//	Hashivenu	Banshee in the Kitchen	3:57
6	Hashiyenu	Faith & Disease	3:20
7	Ain't That News	Newfoundland Symphony Youth Choir	2:06
8	How Can I Keep from Singing	FiddleSticks	2:53
9	How Can I Keep from Singing	Marty Haugen, Jeanne Cotter and David Haas Featuring Bobby Fisher	4:51
10	How Can I Keep from Singing	Enya	4:25
7.0	How Can I Keep from Singing	Bruce Springsteen	2:19
12	How Can I Keep from Singing	SHeDAISY	2:08



Definition

In music, a *canon* is a contrapuntal composition that employs a melody with one or more imitations of the melody played after a given duration (e.g. quarter rest, one measure, etc.). The initial melody is called the *leader*, while the imitative melody is called the *follower* which is performed in a different voice. The follower must be created from the leader by being either an exact replication of the rhythms and intervals of the leader, or a transformation such as those listed in "types of canon" (below).

As shown by most of the compositions in this packet and described below, canons are often entire musical compositions. But, canons can also be employed as a portion of the composition. Canons can also be employed in a composition by some voices, while other voices are not in canon at the same time. For example, an *accompanied canon* is a canon accompanied by one or more additional independent parts which do not take part in imitating the melody.

History

The Old French *canon*, which meant 'learned', was taken from the Greek *kanon* for a rule or law, which eventually came to mean 'an accepted rule' in English, and the term was first used for the rule that describes how the voices relate to each other. Not until the sixteenth century was *canon* used to describe the musical form. The earliest known canons are the rounds (or *rondellus*) in England from the thirteenth century; the best known is *Sumer Is Icumen In*. In the fourteenth century many canons were written in Italy under the name *caccia*, and occasionally French chansons of that period used canon technique. During the period of the Franco-Flemish School (1430-1550), canon as a contrapuntal art form received its greatest development, while the Roman School gave it its most complete application.

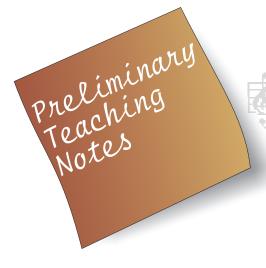
Although, for clarity, this article (and our class) uses leader and follower(s) to denote the leading voice in a canon and those that imitate it, musicological literature also uses the traditional Latin terms *Dux* and *Comes* for "leader" and "follower", respectively. The terms *proposta* for the leader, and *riposta* for the follower, are also common terms.

Throughout musical history, canons have been identified and named in many different ways. A canon of two voices may be called a canon in two, similarly a canon of *x* voices would be called a canon in *x*. Another standard designation is "Canon: Two in One", which means two voices in one canon. "Canon: Four in Two" means four voices with two simultaneous canons. While "Canon: Six in Three" means six voices with three simultaneous canons, and so on.

Perhaps the most common traditional, classical canon is Pachabel's *Canon in D*. It was written in or around 1680, during the Baroque period, as a piece of chamber music for three violins and basso continuo, but has since been arranged for a wide variety of ensembles. *Canon in D* was originally paired with a gigue in the same key, although neither this composition nor the original version of the Canon as Pachelbel wrote it are regularly performed or recorded today.

Many historians believe that Johann Sabstien Bach was perhaps the greatest composer of canons (if not the greatest composer, in general, of all time). Two significant compositions seems to support this claim, which will be referenced and explored below:

The *Goldberg Variations*, BWV 988, are a set of 30 variations for harpsichord by Bach. First published in 1741 as the fourth in a series Bach called *Clavier-Übung*, "keyboard practice", the work is considered to be one of the most important examples of variation form. It is named after Johann Gottlieb Goldberg, who may have been the first performer.



The Musical Offering (German title Musikalisches Opfer or Das Musikalische Opfer), BWV 1079, is a collection of canons and fugues and other pieces of music by Bach, based on a musical theme by Frederick II of Prussia (Frederick the Great) and dedicated to him. The collection has its roots in a meeting between Bach and Frederick II on May 7, 1747. The meeting, taking place in the king's residence in Potsdam, resulted from Bach's son Carl Philipp Emanuel being employed there as court musician. Frederick wanted to show the elder Bach a novelty: the pianoforte had been invented some years earlier, and the king now owned several of the experimental instruments. During his anticipated visit to Frederick's palace in Potsdam, Bach, who was well known for his skill at improvising, received from Frederick a long and complex musical figure to improvise a three-voice fugue. Frederick, then, defied Bach to make that into a six-voice fugue. The public present thought that just a malicious caprice by the king, intent upon humiliating philosophers and artists. Bach answered he would need to work the score and send it to the king afterwards. He then returned to Leipzig to write out the *Thema Regium* ("theme of the king").

Two months after the meeting, Bach published a set of pieces based on this theme which we now know as *The Musical Offering*. Bach inscribed the piece "Regis Iussu Cantio Et Reliqua Canonica Arte Resoluta" (the theme given by the king, with additions, resolved in the canonic style), the first letters of which spell out the word *ricercar* (an older name for fugue). Historians and musical critics now feel that this work may be the greatest composition ever created.

Types of Canon

The most rigid and ingenious forms of canon are not strictly concerned with pattern but also with content. Canons are classified by various traits: the number of voices, the interval at which each successive voice is transposed in relation to the preceding voice, whether voices are inverse, retrograde, or retrograde-inversion; the temporal distance between each voice, whether the intervals of the second voice are exactly those of the original or if they are adjusted to fit the diatonic scale, and the tempo of successive voices. However, canons may also use more than one of the above methods.

Round

The most familiar of the canons might be the perpetual/infinite canon (in Latin: canon perpetuus), round, or simple canon. As each voice of the canon arrives at its end it can begin again, in a perpetual fashion. A round imitates the leader perfectly at the octave or unison. Well-known canons of this type include many famous children's songs such as Row, Row, Row Your Boat and Frère Jacques () In fact, the third mopvement of well known German Romatic composer, Gustav Mahler's First Symphony starts with an accompanied simple canon based on Frère Jacques, transposed in D Minor ().

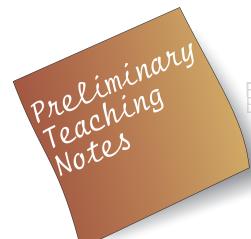
Interval

An *interval canon* imitates the leader at any interval other than the octave or unison (e.g. canon at the second, fifth, seventh, etc.). If the follower imitates the precise interval quality of the leader, then it is called an exact canon; if the follower imitates the interval number (but not the quality), it is called a diatonic canon. Probably the greatest example of this type of canon is Bach's *Goldberg Variations*.

The canons of the *Goldberg Variations* are conveniently ordered systematically so that each successive canon employs a larger interval between leader and follower. The follower may be a tonal imitation of the leader, that is, it may alter the interval qualities somewhat so as to stay in the same key as the leader, or it may be an exact transposition to a new key. Shown below are the excerpts of each of these canons:

Preliminary Teaching Notes





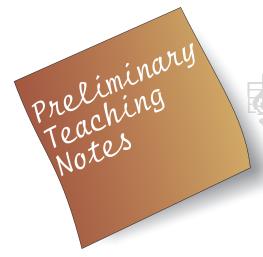
Mirror Canon

An *inverted canon* (also called canon in contrary motion, or *mirror canon*) moves the follower in contrary motion to the leader. Where the leader would go down a fifth, the follower goes up, and vice versa. This process maintains the precise quality of each interval. Mirror canons are not very common, though Bach impressively used the technique in his masterful *Musical Offering* in the *Canon Perpetuus*, and



Canon a 2 Quaerendo invenietis where the leader reads in the alto clef, right side up, while the follower reads in bass clef, upside down.





· Crab Canon

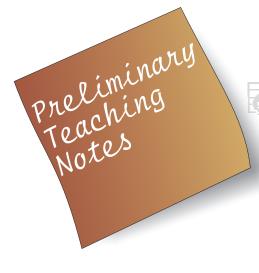
In a *crab canon*, also known as *cancrizans*, the follower accompanies the leader backward (in retrograde). *Canon a 2 cancrizans* from Bach's *Musical Offering* is a **crab canon** as it employs Frederick's royal theme with a second canonic voice stating the theme simultaneously backward.



Retrograde Inversion

A canon that is retrograde and inverted is called a *table canon*. A table canon would be placed on a table with a musician on either side, both reading the same line of music in opposite directions. While at frist glance, the *Canon a 2 Quaerendo invenietis described above may seem to be a table canon, it instructs the follower to read the canon upside down, but not retrograde. Table canons are, in the end, a extremely rare, comical, and unrealistic musical form.*

While true table canons are rare, a notable use of canon worth exploring is the first movement of Henryk Górecki's Third Symphony. Typically 27 minutes in duration, the first movement equals the combined length of the second and third movements, and is based on a late-15th century lament. Comprising three thematic sections, the movement opens with a canon in ten parts using a 24-measure melody. It begins with double basses, and each succeeding entry occurs one measure later (i.e., a new entry begins every 25 measures), starting a fifth above the last (interval canon). After the canon reaches a full 10 parts, it works its way back to a single pitch. A soprano enters in the second section and builds to a climax on the final word, at which point the strings enter forcefully with the climax of the opening canon. The third section of the movement is a long dénouement, still in canon, that also winds down to a single pitch. The perception is that the third section literally performs the first section backwards, much like a table or crab canon.



Mensuration/Tempo

In a *mensuration canon* (also known as a *prolation canon*, or a *proportional canon*), the follower imitates the leader by some rhythmic proportion. For example, the follower may double the rhythmic values of the leader (*augmentation* or *sloth canon*) or it may cut the rhythmic proportions in half (*diminution* canon). *Phasing* involves the application of modulating rhythmic proportions according to a sliding scale.

Technically, mensuration canons are among the most difficult to write. Many such canons were composed during the Renaissance, particularly in the late fifteenth and early sixteenth centuries. Johannes Ockeghem wrote an entire mass (the *Missa Prolationum*) in which each section is a mensuration canon, and all at different speeds and entry intervals.

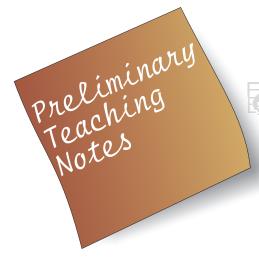
Twentieth century composer, Conlon Nancarrow composed complex tempo or mensural canons, mostly for the player piano (*Study No. 36*) as they are extremely difficult to play; they have also influenced many younger composers. One of those composers, Larry Polansky has an album of mensuration canons entitled *Four-Voice Canons*. This album, released in 2002, is the fruits of 25 years of the composer's experimentation with the mensuration canon. Each piece features four voices entering in canon form, each voice going through its line faster than the previous so that all four voices finish at the same time. Highlites inclued the oldest, *No. 4*, written in 1978, and unique newer tracks including *No. 14: Kid Canon*, and *No. 17: Guitar Canon*.

Minimalist composer, Steve Reich, took the concept of *mensuration canon* to a further extreme as he created entire pieces of music using a technique called *phasing*, which is essentially a simple canon (or round) with the distance between the leader and follower changing (often very slowly). In Reich's *Piano Phase* the performers repeat a rapid twelve-note melodic figure, initially in unison. As one player keeps tempo with robotic precision, the other speeds up very slightly until the two parts line up again, but one sixteenth note apart. The second player then resumes the previous tempo. This cycle of speeding up and then locking in continues throughout the piece; the cycle comes full circle three times, the second and third cycles using shorter versions of the initial figure.

Reich also tried to create the phasing effect in a piece that would need no instrument beyond the human body. So, he composed *Clapping Music*, in which the players do not phase in and out with each other, but instead one performer keeps one line of a 12-eighth-note-long phrase and the other performer shifts by one eighth-note beat every 12 measures, until both performers are back in unison 144 measures later.

Puzzle canon

A puzzle canon can be any of the above types, but only one voice is notated, and it is up to the performer to find out which rule applies to the canon. Often some kind of riddle is given as a hint. Machaut's rondeau Ma fin est mon commencement est ma fin (My end is my beginning and my beginning is my end) is a crab canon with a third voice which is a musical palindrome. In the Agnus Dei movement of Dufay's mass L'homme armé is this rule noted: Cancer eat plenis et redeat medius ('Let the crab proceed full and return half'). This means that the cantus firmus must be sung first in full note values (and retrograde, since it is a crab), then in halved values (diminution) and retrograde (that is, normal motion, since it is a crab).



Why do composers write canons?

• More than a Game

Bach and many other composer may have (and continue to) composed canons for the same reason that we solve crossword puzzles or do Sodoku; they're entertainment...a game. Perhaps people compose canons because they find them a intriguing challenge. Or perhaps composers look to canons to stimulate and generate new ideas by employing canonic techniques. There is reason to suspect, however, that for many, composing canons is more than a game, challenge, or method for generating ideas:

Window into the laws of music

Bach and most composers attest to the notion that music is a science. This philosophy started to be especially strong in the Baroque time period with *Lorenz Christoph Mizler* who was a German physician, mathematician, and writer on music. He founded the *Korrespondierenden Sozietät der Musicalischen Wissenschaften* (*Corresponding Society of the Musical Sciences*) in 1738. The aim of this organization was to advocate the establishment of a musical science based firmly on mathematics, philosophy, and the natural laws of acoustics. Membership in this society was by invitation only. Bach, Teleman, Handel, and Mozart were all invited to be a part of the society (however, Mozart declined the invitation). Bach joined the society in 1747 while composing the *Musical Offering*.

If Bach believed that music was a science, he (and other composers) may have utilized canon as a means to gain a glimpse its laws. That is, the perfect cyclical and natural elaboration and development of ideas from a single, simple theme that is demonstrated by canons. Bach and other composers' fascination with canon is quite likely more than entertainment, but an exploration of the natural, mathematical, and scientific characteristics of music.

Mystery of Musical Creation

There remains a third possible explanation why Bach and other composers have practiced the art of writing canons. The technique may have stood for them as a symbol of all that was NOT understood...that which was transcendent, therefore symbolic of themselves as creators and the processes of musical creation. While Bach and other composers may have composed canons in an effort to understand these processes, they could just as well have composed them as an expression of the very mystery of musical creation itself. For example, we know by their enigmatical notations that Baroque composers viewed canon as something to be figured out, if not mediated by that select few (namely, composers and musical scholars) who understood it.

· Genitum non factum

The theological implications of the canon, while speculative to be sure, invite contemplation none the less. Just as a well-composed leader has the potential to animate itself in diverse followers, so too, according to Christian theology