

Tessellations

By Devina Boughton (2020-2021)
For Sound Icon

exploring the possibilities of translating knitting into composition, using mathematical concepts

Overall birds and fish.

In this pattern, the knitting tessellated from fish into birds, inspired by M.C. Escher. First, I knitted a sleeve of my sweater with orange fish turning into green birds. Now, I am knitting green fish turning into orange birds to invert the colors for the second sleeve (a veritable color party!) There are 66 rows, and 46 stitches. There are 4 distinguishable fish, and 4 distinguishable birds, and 2 birds and fish rows that are overlapping as the metamorphosis occurs. By “distinguishable”, I mean that the pictures of bird/fish are not or rarely are running into the background, and are clearly separated by the other color so that the shape pops out. Thusly, it looks like:

4 2 birds
2 both
4 2 fish

I knit the pattern bottom to top, so I am also starting my composition with the fish, and we are starting with orange fish and green birds, since that has been on my mind being the first sweater sleeve that I have been knitting in quarantine. There is something about knitting that is meditative and rhythmic, and something that seems very long and painstaking, so I wanted to also capture those feelings in my piece.





Tessellations I: Fish Sequence

a mathematical tone poem to knitting
M.C. Escher inspired sweater sleeves

Devina Boughton

flowing ♩ = 120 **I. First Row**
cast on and knit 46 stitches

Alto Flute

Clarinet in B \flat

Violin

Cello

con sordino

ppp *pp* *p* *pp* *p* *pp*

con sordino

< p > *< p >* *< p >*

A. Fl.

B \flat Cl.

Vln.

Vc.

mp *mf* *mp* *p*

> p > *< mp >* *< mp >* *< mp >* *< mf >* *p*

A II. Creation of First Fish

A. Fl.

B \flat Cl.

Vln.

Vc.

10

mp *mp pp* *p*

p *mp* *p* *mp*

A. Fl.

B \flat Cl.

Vln.

Vc.

14

ppp

ppp

> p

B

Musical score for measures 18-21. The score is in 3/4 time, with a 4/4 time signature change at measure 20. The instruments are A. Fl., B \flat Cl., Vln., and Vc. The A. Fl. part has a dynamic marking of *p*. The B \flat Cl. part has a dynamic marking of *p* and a sharp sign above the first note. The Vln. part has a dynamic marking of *pp* and includes markings for *pizz.* and *arco*. The Vc. part includes markings for *pizz.* and *arco*.

Musical score for measures 22-25. The score is in 3/4 time, with a 4/4 time signature change at measure 24. The instruments are A. Fl., B \flat Cl., Vln., and Vc. The A. Fl. part has a dynamic marking of *p*. The B \flat Cl. part has a dynamic marking of *ppp* and includes triplet markings. The Vln. part includes triplet markings. The Vc. part includes markings for *pizz.* and *arco* and includes triplet markings.

Tessellations I: Fish Sequence

4

C

Musical score for measures 25-28, featuring A. Fl., B \flat Cl., Vln., and Vc. The score is in 4/4 time and includes dynamic markings such as *p*, *mp*, and *ppp*. The A. Fl. part starts with a rest, followed by a quarter note G \flat and eighth notes F \flat and E \flat . The B \flat Cl. part has a rest, followed by a quarter note G \flat and eighth notes F \flat and E \flat . The Vln. part has a quarter note G \flat and eighth notes F \flat and E \flat . The Vc. part has a quarter note G \flat and eighth notes F \flat and E \flat . The score includes a key signature change to one flat and a time signature change to 3/8.

Musical score for measures 28-31, featuring A. Fl., B \flat Cl., Vln., and Vc. The score is in 4/4 time and includes triplets. The A. Fl. part has a quarter note G \flat and eighth notes F \flat and E \flat . The B \flat Cl. part has a quarter note G \flat and eighth notes F \flat and E \flat . The Vln. part has a quarter note G \flat and eighth notes F \flat and E \flat . The Vc. part has a quarter note G \flat and eighth notes F \flat and E \flat . The score includes a key signature change to one flat and a time signature change to 3/8.

D

Musical score for measures 29-31, featuring A. Fl., B♭ Cl., Vln., and Vc. The score includes dynamic markings (*p*, *mp*, *pp*, *ppp*, *fp*) and articulation (accents, slurs). The Vln. part features triplet markings (3) and a dynamic change from *fp* to *mp* to *p*. The Vc. part features a dynamic change from *pp* to *ppp* to *mp*.

Musical score for measures 32-34, featuring A. Fl., B♭ Cl., Vln., and Vc. The score includes dynamic markings (*ppp*, *p*, *pp*) and articulation (accents, slurs). The A. Fl. part features a dynamic change from *ppp* to *p* to *ppp*. The B♭ Cl. part features a dynamic change from *p* to *ppp* to *p*. The Vc. part features a dynamic change from *p* to *ppp* to *p*. The score includes time signature changes from 4/4 to 2/4 and back to 4/4.

Tessellations I: Fish Sequence

6

E

A. Fl. *p* *mp* *p*

B \flat Cl. *pp* *p*

Vln. ³⁴ *ppp* *pp* *p* 3

Vc. *mp* *pp* *mp*

A. Fl. ³⁷ *mp* *pp* *mp*

B \flat Cl. *fp* 3

Vln. ³⁷ *pp*

Vc. *mp* *pp* *mp* *pp* pizz. 3

40

A. Fl.

B \flat Cl.

Vln.

Vc.

pp

pp

mp

pp

mp

p

pp

Detailed description: This system of music covers measures 40, 41, and 42. The A. Fl. part starts with a half note G4, followed by a quarter note G4, and then rests. Dynamics are *pp* for the first two notes and *mp* for the final half note. The B \flat Cl. part features a triplet of eighth notes (F4, G4, A4) in measure 40, followed by eighth notes in measure 41, and another triplet of eighth notes in measure 42. Dynamics are *pp*. The Vln. part has a triplet of eighth notes (G4, A4, B4) in measure 40, followed by eighth notes in measure 41, and another triplet of eighth notes in measure 42. Dynamics are *mp* and *p*. The Vc. part has a triplet of eighth notes (F3, G3, A3) in measure 40, followed by quarter notes in measure 41, and a quarter note in measure 42. Dynamics are *pp*.

43

A. Fl.

B \flat Cl.

Vln.

Vc.

mp

p

pp

p

pp

pp

fp

pp

p

mp

p

p

Detailed description: This system of music covers measures 43, 44, and 45. The A. Fl. part has a quarter note G4 in measure 43, followed by a quarter note G4, and then rests. Dynamics are *mp*, *p*, *pp*, and *p*. The B \flat Cl. part features a triplet of eighth notes (F4, G4, A4) in measure 43, followed by eighth notes in measure 44, and another triplet of eighth notes in measure 45. Dynamics are *pp*, *fp*, and *pp*. The Vln. part has a triplet of eighth notes (G4, A4, B4) in measure 43, followed by eighth notes in measure 44, and another triplet of eighth notes in measure 45. Dynamics are *p*, *mp*, and *p*. The Vc. part has a quarter note G3 in measure 43, followed by quarter notes in measure 44, and quarter notes in measure 45. Dynamics are *p*.

Tessellations I: Fish Sequence

8

46

A. Fl.

B \flat Cl.

Vln.

Vc.

Dynamic markings: *p*, *mp*, *p*, *pp*, *fp*

Measure 46: A. Fl. has a half note G4 with a slur and a dynamic of *p*. B \flat Cl. has a triplet of eighth notes (F4, G4, A4) with a dynamic of *pp*. Vln. has a triplet of eighth notes (G4, A4, B4) with a dynamic of *p*. Vc. has a half note G3 with a dynamic of *pp*. Measure 47: A. Fl. has a half note A4 with a slur and a dynamic of *mp*. B \flat Cl. has a triplet of eighth notes (G4, A4, B4) with a dynamic of *fp*. Vln. has a half note A4 with a slur and a dynamic of *mp*. Vc. has a half note G3 with a dynamic of *fp*.

48

A. Fl.

B \flat Cl.

Vln.

Vc.

Dynamic markings: *p*, *fp*, *mp*, *mp*, *ppp*, *fp*

Measure 48: A. Fl. has a half note A4 with a slur and a dynamic of *fp*. B \flat Cl. has a half note G4 with a dynamic of *p*. Vln. has a triplet of eighth notes (G4, A4, B4) with a dynamic of *mp*. Vc. has a triplet of eighth notes (G3, A3, B3) with a dynamic of *ppp*. Measure 49: A. Fl. has a half note B4 with a slur and a dynamic of *mp*. B \flat Cl. has a half note A4 with a dynamic of *mp*. Vln. has a triplet of eighth notes (G4, A4, B4) with a dynamic of *mp*. Vc. has a triplet of eighth notes (G3, A3, B3) with a dynamic of *fp*.

50

A. Fl.

B \flat Cl.

Vln.

Vc.

fp

ppp

fp

p

fp

52

A. Fl.

B \flat Cl.

Vln.

Vc.

p

pp

fp

mp

f

fp

F

III. Seeing the Fish

A. Fl.

B \flat Cl.

Vln.

Vc.

56

Senza sord.

mp *mf* *mp*

pp

mp *mf* *mp*

A. Fl.

B \flat Cl.

Vln.

Vc.

59

pp *p*

mf *f*

mf *f*

G

IV. Creation of Second Fish

Musical score for measures 61-63, featuring A. Fl., B♭ Cl., Vln., and Vc. The score includes dynamics such as *p*, *pp*, *mp*, and *pizz.*

A. Fl. (Alto Flute): Rests in measures 61 and 62. In measure 63, it plays a half note G4 with a *mp* dynamic.

B♭ Cl. (B-flat Clarinet): Starts in measure 61 with a half note G3 (*p*), followed by a half note F3 (*pp*). In measure 62, it plays a half note G3 (*p*) and a half note F3 (*mp*). In measure 63, it plays a half note G3 (*p*) and a half note F3 (*mp*).

Vln. (Violin): Rests in measures 61 and 62. In measure 63, it plays a half note G3 (*p*).

Vc. (Violoncello): Starts in measure 61 with a half note G2 (*p*), followed by a half note F2 (*pp*). In measure 63, it plays a half note G2 (*p*) with a *pizz.* (pizzicato) marking.

Musical score for measures 64-67, featuring A. Fl., B♭ Cl., Vln., and Vc. The score includes dynamics such as *p*, *mp*, and *arco*, and includes triplets and a *pizz.* marking.

A. Fl. (Alto Flute): Starts in measure 64 with a half note G4 (*p*), followed by a half note F4 (*mp*). In measure 65, it plays a half note G4 (*p*). In measure 66, it plays a half note G4 (*p*). In measure 67, it plays a half note G4 (*p*).

B♭ Cl. (B-flat Clarinet): Starts in measure 64 with a half note G3 (*p*), followed by a half note F3 (*mp*). In measure 65, it plays a triplet of eighth notes G3, F3, E3 (*p*). In measure 66, it plays a triplet of eighth notes G3, F3, E3 (*p*). In measure 67, it plays a triplet of eighth notes G3, F3, E3 (*p*).

Vln. (Violin): Rests in measures 64 and 65. In measure 66, it plays a half note G3 (*p*), followed by a half note F3 (*p*). In measure 67, it plays a half note G3 (*p*).

Vc. (Violoncello): Rests in measures 64 and 65. In measure 66, it plays a half note G2 (*arco*). In measure 67, it plays a half note G2 (*pizz.*).

Tessellations I: Fish Sequence

12

H

67

A. Fl.

B \flat Cl.

Vln.

Vc.

arco

pizz.

69

A. Fl.

B \flat Cl.

Vln.

Vc.

pizz.

arco

I

72

A. Fl.

B \flat Cl.

Vln.

Vc.

mp

p

fp

ppp

ppp

pp

p

arco

3

75

A. Fl.

B \flat Cl.

Vln.

Vc.

pp

pp

p

pizz.

arco

pizz.

p

pp

p

Tessellations I: Fish Sequence

14

J

Musical score for measures 79-82. The score is in 2/4 time and features four staves: A. Fl., B♭ Cl., Vln., and Vc. The key signature has one flat (B♭).
- **A. Fl.:** Starts with a quarter rest, followed by eighth notes. Dynamics: *pp* (measures 79-80), *mp* (measures 81-82).
- **B♭ Cl.:** Starts with a quarter rest, followed by eighth notes. Dynamics: *mp* (measures 81-82).
- **Vln.:** Starts with a quarter rest, followed by a dotted half note. Dynamics: *arco* (measures 79-80), *pizz.* (measures 81-82).
- **Vc.:** Starts with a quarter rest, followed by eighth notes. Dynamics: *p* (measures 81-82).

Musical score for measures 83-86. The score is in 2/4 time and features four staves: A. Fl., B♭ Cl., Vln., and Vc. The key signature has one flat (B♭).
- **A. Fl.:** Dynamics: *mp* (measures 83-84), *p* (measure 85), *ppp* (measure 86), *p* (measures 83-84, 85-86).
- **B♭ Cl.:** Dynamics: *p* (measures 83-84), *p* (measures 85-86).
- **Vln.:** Dynamics: *p* (measures 83-84), *mp* (measure 85), *p* (measures 83-84, 85-86), *pizz.* (measures 85-86).
- **Vc.:** Dynamics: *pp* (measures 83-84), *p* (measures 85-86), *ppp* (measures 83-84), *p* (measures 85-86).

K

86

A. Fl. *p* *pp*

B \flat Cl. *mp* *pp* *p*

Vln. *arco* *pp* *mp* *pp*

Vc. *mp* *pp* *mp*

89

A. Fl.

B \flat Cl. *fp*

Vln. *mp* *pp*

Vc. *mf* *p*

Tessellations I: Fish Sequence

91

A. Fl. *pp* *p* *mp*

B \flat Cl. *pp* *p* *pp*

Vln. *mp* *fp*

Vc. *mf* *pp* *fp*

L ♩=♩.

A. Fl. *p*

B \flat Cl. *pp* *p*

Vln. *p* *mp*

Vc. *p* *mp*

93

95

A. Fl.

B♭ Cl.

pp *p* *p* *pp*

p *mp* *p*

95

Vln.

Vc.

p *mp* *p* *pp*

f *p* *pizz.*

99

A. Fl.

B♭ Cl.

pp *p*

p

99

Vln.

Vc.

p *pp* *p*

p *pp* *p*

arco

103

A. Fl. *pp* *p*

B \flat Cl. *p* *mp*

103

Vln. *mp* *mf* *ppp*

Vc. *pp* *fp* *ppp*

pizz. arco pizz.

107

A. Fl. *ppp* *pp* *ppp*

B \flat Cl. *pp* *ppp* *pp* *ppp*

107

Vln. *pp* *f* *p* *fp*

Vc. *pp* *fp* *fp* *fp*

pizz. arco

110

A. Fl. *p* *pp* *ff*

B♭ Cl. *pp* *ff*

Vln. *f* *p*

Vc. *ppp* *p* arco pizz.

(♩.=♩)

M V. Vision of Second Fish
(starting with the latter half)

113

A. Fl. *p* *mp* *mp*

B♭ Cl. *ppp* *mp* *mp*

Vln. *mf* *f*

Vc. *mf* *f*

Musical score for measures 117-120. The score is for four instruments: A. Fl., B♭ Cl., Vln., and Vc. The key signature has one flat (Bb). The time signature is 3/4. Measure 117 starts with a treble clef and a key signature of one flat. The A. Fl. part begins with a dynamic marking of *p*. The B♭ Cl. part begins with a dynamic marking of *p*, followed by *mp*, *p*, and *mf*. The Vln. part begins with a dynamic marking of *mp*, followed by *f*, and *mp*. The Vc. part begins with a dynamic marking of *mp*, followed by *f*, *p*, and *mp*.

N VI. Fish #3

Musical score for measures 121-123. The score is for four instruments: A. Fl., B♭ Cl., Vln., and Vc. The key signature has one flat (Bb). The time signature is 3/4. Measure 121 starts with a treble clef and a key signature of one flat. The A. Fl. part begins with a dynamic marking of *mp*. The B♭ Cl. part begins with a dynamic marking of *mp*, followed by *p*. The Vln. part begins with a dynamic marking of *mf*. The Vc. part begins with a dynamic marking of *ppp*, followed by *mf*.

124

A. Fl. *mp* *p* *p*

B \flat Cl. *mp* *pp*

124 125 126

124

Vln. *f* *mp* *f*

Vc. *f* *mp* *f*

124 125 126

127

A. Fl. *mp* *pp* *mp*

B \flat Cl. *pp* *mp*

127 128 129

127

Vln. *mp* *mf*

Vc. *mp* *mf*

127 128 129

P VIII. Fish 4

A. Fl.

B \flat Cl.

135

Vln.

Vc.

mp *p*

138

A. Fl.

B \flat Cl.

p *p* *mp*

138

Vln.

Vc.

mp *p*

mp *p*