



MUSIC OF THE SPHERES
TIM GRIFFIN



1
00:00:00,719 --> 00:00:03,669
so uh

2
00:00:07,829 --> 00:00:05,990
we all you know the there are two real

3
00:00:10,150 --> 00:00:07,839
purposes behind what i do one is to get

4
00:00:12,230 --> 00:00:10,160
the kids or grown-ups excited about

5
00:00:14,789 --> 00:00:12,240
whatever the thing is to give them some

6
00:00:16,870 --> 00:00:14,799
kind of take away but it's also a study

7
00:00:19,109 --> 00:00:16,880
tool because one thing we've been doing

8
00:00:20,870 --> 00:00:19,119
for thousands of years is taking our

9
00:00:23,990 --> 00:00:20,880
most important knowledge and turning it

10
00:00:26,230 --> 00:00:24,000
into pictures and dances and songs

11
00:00:29,269 --> 00:00:26,240
the iliad the odyssey beowulf

12
00:00:31,669 --> 00:00:29,279
bhagavad-gita torah those were all songs

13
00:00:34,549 --> 00:00:31,679

long before they were written down

14

00:00:35,990 --> 00:00:34,559

so one of the ways i realized that

15

00:00:37,510 --> 00:00:36,000

this there was really something to what

16

00:00:39,910 --> 00:00:37,520

i was doing here was when i started

17

00:00:41,350 --> 00:00:39,920

getting getting feedback from teachers

18

00:00:43,670 --> 00:00:41,360

in middle school

19

00:00:45,270 --> 00:00:43,680

about kids who had been with me when

20

00:00:47,830 --> 00:00:45,280

they were in fourth grade

21

00:00:50,150 --> 00:00:47,840

and i and i would go to district-wide

22

00:00:51,430 --> 00:00:50,160

school teacher conferences and i would

23

00:00:53,270 --> 00:00:51,440

hear middle school teachers asking

24

00:00:54,950 --> 00:00:53,280

where's mr griffin

25

00:00:56,389 --> 00:00:54,960

they said i had a kid that come in and

26
00:00:57,750 --> 00:00:56,399
come into my room and already knows how

27
00:00:59,270 --> 00:00:57,760
to read the periodic table of the

28
00:01:01,349 --> 00:00:59,280
elements because of a song that you

29
00:01:02,950 --> 00:01:01,359
taught them and they sang it for me word

30
00:01:04,070 --> 00:01:02,960
for word four years after they did it

31
00:01:06,149 --> 00:01:04,080
with you

32
00:01:07,990 --> 00:01:06,159
and then when i was a teacher long

33
00:01:10,310 --> 00:01:08,000
enough that some of my former students

34
00:01:12,550 --> 00:01:10,320
turned into grown-ups i was

35
00:01:14,630 --> 00:01:12,560
in a shopping you know it's a grocery

36
00:01:17,030 --> 00:01:14,640
store near my school one day

37
00:01:18,789 --> 00:01:17,040
and a man spots me

38
00:01:20,469 --> 00:01:18,799

in the produce section and he leans over

39

00:01:22,469 --> 00:01:20,479

the bananas and just shoves me in the

40

00:01:24,149 --> 00:01:22,479

chest with his great big finger and

41

00:01:26,789 --> 00:01:24,159

starts singing a song at me about the

42

00:01:29,109 --> 00:01:26,799

water cycle and he's using all the

43

00:01:31,350 --> 00:01:29,119

vocabulary correctly and i realized this

44

00:01:32,950 --> 00:01:31,360

this is one of my former students i said

45

00:01:34,230 --> 00:01:32,960

you were in my classes oh yeah i said

46

00:01:35,270 --> 00:01:34,240

god i hope i was nice to you because he

47

00:01:37,670 --> 00:01:35,280

was huge

48

00:01:39,749 --> 00:01:37,680

but he said yeah you were all right but

49

00:01:40,550 --> 00:01:39,759

so here's an example of something we do

50

00:01:42,230 --> 00:01:40,560

for

51
00:01:43,590 --> 00:01:42,240
fifth grade but also but it comes up

52
00:01:45,429 --> 00:01:43,600
again in high school here's the

53
00:01:46,950 --> 00:01:45,439
circulatory system just the vowels and

54
00:01:49,190 --> 00:01:46,960
chambers of the heart

55
00:01:51,830 --> 00:01:49,200
and what i try to do is not define

56
00:01:55,350 --> 00:01:51,840
things but use them in context make you

57
00:01:58,069 --> 00:01:55,360
know make a story about it sort of so

58
00:02:00,469 --> 00:01:58,079
so the conceit of this one is uh you

59
00:02:02,950 --> 00:02:00,479
know my own musical background is mostly

60
00:02:04,950 --> 00:02:02,960
country music

61
00:02:06,709 --> 00:02:04,960
and you hear on country radio all these

62
00:02:08,630 --> 00:02:06,719
songs about the heart and they almost

63
00:02:10,229 --> 00:02:08,640

always get the physiology completely

64

00:02:14,390 --> 00:02:10,239

wrong

65

00:02:18,150 --> 00:02:14,400

so we fixed that you know my heart

66

00:02:21,589 --> 00:02:18,160

has got four chambers

67

00:02:23,990 --> 00:02:21,599

two ventricles below two atria above and

68

00:02:26,869 --> 00:02:24,000

all four chambers are filled with love

69

00:02:32,869 --> 00:02:29,910

but that's a metaphor you see

70

00:02:35,509 --> 00:02:32,879

because my heart beats just for me

71

00:02:38,550 --> 00:02:35,519

you know i need my heart to pump my

72

00:02:41,589 --> 00:02:38,560

blood but that don't mean i'm not in

73

00:02:44,710 --> 00:02:41,599

love with you

74

00:02:47,830 --> 00:02:44,720

my right atrium gets blood from the

75

00:02:53,430 --> 00:02:50,270

and the sends it down through my

76

00:02:57,390 --> 00:02:53,440

tricuspid valve

77

00:03:01,270 --> 00:02:57,400

my right ventricle contracts while my

78

00:03:05,509 --> 00:03:01,280

pulmonary valve acts like a one-way door

79

00:03:09,030 --> 00:03:05,519

going up you see the my pulmonary artery

80

00:03:11,589 --> 00:03:09,040

my blood goes to my lungs to pick up

81

00:03:15,370 --> 00:03:11,599

oxygen

82

00:03:16,949 --> 00:03:15,380

and also to get rid of

83

00:03:20,830 --> 00:03:16,959

[Applause]

84

00:03:24,229 --> 00:03:20,840

then the co2 come back again through my

85

00:03:26,950 --> 00:03:24,239

pulmonary veins and then my heart keeps

86

00:03:28,309 --> 00:03:26,960

bleeding for me not for you

87

00:03:31,190 --> 00:03:28,319

[Music]

88

00:03:34,949 --> 00:03:31,200

you know my heart

89

00:03:38,229 --> 00:03:34,959

has got four chambers

90

00:03:41,110 --> 00:03:38,239

two ventricles below two atria above but

91

00:03:45,110 --> 00:03:41,120

that's got nothing to do with love it's

92

00:03:51,190 --> 00:03:48,149

you know i need my heart it's true

93

00:03:54,470 --> 00:03:51,200

that's why i won't give it to you

94

00:03:58,830 --> 00:03:54,480

because i need my heart to pump my blood

95

00:04:03,070 --> 00:03:58,840

but that don't mean i'm not in love with

96

00:04:06,149 --> 00:04:03,080

you my left atrium gets blood from the

97

00:04:09,350 --> 00:04:06,159

pulmonary veins

98

00:04:11,270 --> 00:04:09,360

and sends along down through my mitral

99

00:04:15,350 --> 00:04:11,280

valve

100

00:04:19,590 --> 00:04:15,360

my left ventricle to squeeze blood out

101
00:04:22,069 --> 00:04:19,600
to my arteries through my aortic valve

102
00:04:25,990 --> 00:04:22,079
you know it's sort of like a one-way

103
00:04:29,430 --> 00:04:26,000
door to my aorta my blood will circulate

104
00:04:32,710 --> 00:04:29,440
through all my systems

105
00:04:34,150 --> 00:04:32,720
and pass through capillaries along the

106
00:04:37,749 --> 00:04:34,160
way

107
00:04:40,790 --> 00:04:37,759
they say my heart has so much parrot

108
00:04:42,520 --> 00:04:40,800
beats four thousand times an hour and

109
00:04:46,070 --> 00:04:42,530
pumps

110
00:04:48,870 --> 00:04:46,080
[Music]

111
00:04:52,629 --> 00:04:48,880
you know my heart

112
00:04:55,990 --> 00:04:52,639
has got four chambers

113
00:04:58,390 --> 00:04:56,000

two ventricles below two atria above and

114

00:05:01,189 --> 00:04:58,400

all four chambers are filled with blood

115

00:05:07,029 --> 00:05:04,150

i'll never give my heart to you

116

00:05:10,469 --> 00:05:07,039

but don't let that make you blue

117

00:05:15,350 --> 00:05:10,479

i only need my heart to hunt my blood so

118

00:05:19,029 --> 00:05:15,360

that don't mean i'm not in love with you

119

00:05:22,310 --> 00:05:19,039

i only need my heart to pump my blood

120

00:05:30,390 --> 00:05:22,320

and i don't mean i'm not in love with

121

00:05:32,710 --> 00:05:31,430

so

122

00:05:34,629 --> 00:05:32,720

anyway

123

00:05:36,710 --> 00:05:34,639

i'll direct your attention over there

124

00:05:39,430 --> 00:05:36,720

that's my contact info i'm tim at

125

00:05:41,189 --> 00:05:39,440

griffined

126

00:05:42,870 --> 00:05:41,199

if you'd like to write a song together

127

00:05:44,790 --> 00:05:42,880

or if you're an educator and you want

128

00:05:46,469 --> 00:05:44,800

help writing something for your students

129

00:05:48,390 --> 00:05:46,479

i've worked with college professors to

130

00:05:50,150 --> 00:05:48,400

write songs for their freshmen just to

131

00:05:51,749 --> 00:05:50,160

kind of bring up to speed on the basics

132

00:05:53,110 --> 00:05:51,759

of the topic so you're not having to

133

00:05:54,790 --> 00:05:53,120

re-teach all the stuff they would have

134

00:05:56,150 --> 00:05:54,800

learned in high school if they'd been

135

00:05:58,629 --> 00:05:56,160

paying attention

136

00:06:00,870 --> 00:05:58,639

or for any kind of outreach

137

00:06:03,830 --> 00:06:00,880

that's my mission is to is to help

138

00:06:05,990 --> 00:06:03,840

people tell their stories through song

139

00:06:08,070 --> 00:06:06,000

to help other people learn cool stuff

140

00:06:11,270 --> 00:06:08,080

and we we keep it all in the library on

141

00:06:13,430 --> 00:06:11,280

our website and we do it we usually meet

142

00:06:15,029 --> 00:06:13,440

on zoom i was hoping to maybe put

143

00:06:17,510 --> 00:06:15,039

together a little workshop this week to

144

00:06:19,590 --> 00:06:17,520

write a song about astrobiology but

145

00:06:21,270 --> 00:06:19,600

everyone is just so excited here to see

146

00:06:22,629 --> 00:06:21,280

their friends again that i ask people

147

00:06:23,990 --> 00:06:22,639

can i sit with you for a couple of hours

148

00:06:25,350 --> 00:06:24,000

like no

149

00:06:27,350 --> 00:06:25,360

which is fine

150

00:06:28,710 --> 00:06:27,360

so you know but it works fine on zoom

151
00:06:30,790 --> 00:06:28,720
because that way we can take our time

152
00:06:32,469 --> 00:06:30,800
with it it really is fast it's fun and

153
00:06:34,550 --> 00:06:32,479
we've had some really good songs out of

154
00:06:37,110 --> 00:06:34,560
it so thank you for your time i'll wrap

155
00:06:38,550 --> 00:06:37,120
up with one more song uh before before

156
00:06:40,469 --> 00:06:38,560
we get you know we let the sound crew go

157
00:06:43,029 --> 00:06:40,479
for the night uh

158
00:06:46,070 --> 00:06:43,039
give me give choose please engineering

159
00:06:49,270 --> 00:06:46,080
or cosmology

160
00:06:51,029 --> 00:06:49,280
cosmology it is okay

161
00:06:53,270 --> 00:06:51,039
so

162
00:06:55,029 --> 00:06:53,280
you probably know the story about how

163
00:06:58,070 --> 00:06:55,039

when isaac newton

164

00:07:00,790 --> 00:06:58,080

published his principia

165

00:07:02,710 --> 00:07:00,800

one of the questions people asked was

166

00:07:04,550 --> 00:07:02,720

okay well make what makes you so special

167

00:07:05,909 --> 00:07:04,560

that you're solving these problems that

168

00:07:07,670 --> 00:07:05,919

other people struggled with for

169

00:07:09,189 --> 00:07:07,680

thousands of years and what he said was

170

00:07:11,510 --> 00:07:09,199

something the effect of

171

00:07:14,550 --> 00:07:11,520

if i have seen further it is because i

172

00:07:16,870 --> 00:07:14,560

stand on the shoulders of giants

173

00:07:19,189 --> 00:07:16,880

so this is a song about cosmology but

174

00:07:21,890 --> 00:07:19,199

also about the whole scientific process

175

00:07:31,189 --> 00:07:21,900

about how we build on what came before

176

00:07:34,469 --> 00:07:31,199

[Music]

177

00:07:37,029 --> 00:07:34,479

aristotle said the world is a ball

178

00:07:39,909 --> 00:07:37,039

unrolled a scroll and made a map of it

179

00:07:42,850 --> 00:07:39,919

all he put the planets in the sky

180

00:07:45,029 --> 00:07:42,860

moving around the earth every day

181

00:07:48,710 --> 00:07:45,039

[Music]

182

00:07:51,189 --> 00:07:48,720

copernicus drew a very different one

183

00:07:54,150 --> 00:07:51,199

pictured all the planets going round the

184

00:07:58,950 --> 00:07:54,160

sun then galileo built a telescoping

185

00:08:03,110 --> 00:08:01,430

you know that each generation learns a

186

00:08:05,670 --> 00:08:03,120

little bit more

187

00:08:08,309 --> 00:08:05,680

pulling back the curtains opening up the

188

00:08:10,710 --> 00:08:08,319

door but it's only when we're standing

189

00:08:15,830 --> 00:08:10,720

on the shoulders of giants we could see

190

00:08:20,909 --> 00:08:18,309

kepler said it had to run on rational

191

00:08:23,670 --> 00:08:20,919

rules tried to work it out with

192

00:08:26,150 --> 00:08:23,680

geometrical tools he gave us orbital

193

00:08:30,230 --> 00:08:26,160

mechanics but he couldn't figure why it

194

00:08:33,750 --> 00:08:32,310

newton knew the secret when he saw an

195

00:08:36,070 --> 00:08:33,760

apple fall

196

00:08:39,029 --> 00:08:36,080

said there had to be one force to rule

197

00:08:43,909 --> 00:08:39,039

them all he gave us three laws of motion

198

00:08:48,150 --> 00:08:46,470

you know that each generation learns a

199

00:08:50,710 --> 00:08:48,160

little bit more

200

00:08:53,350 --> 00:08:50,720

coming back the curtain opening up the

201
00:08:55,829 --> 00:08:53,360
door but it's only when we're standing

202
00:08:59,590 --> 00:08:55,839
on the shoulders of giants we can see

203
00:09:02,230 --> 00:08:59,600
the things we didn't before

204
00:09:04,630 --> 00:09:02,240
each generation making new ways to

205
00:09:06,630 --> 00:09:04,640
question how the pieces of the universe

206
00:09:09,030 --> 00:09:06,640
go

207
00:09:12,550 --> 00:09:09,040
and each new breakthrough just a part of

208
00:09:15,750 --> 00:09:12,560
the progression how far it'll go

209
00:09:19,990 --> 00:09:18,550
we're always redefining and refining the

210
00:09:22,070 --> 00:09:20,000
rules

211
00:09:24,470 --> 00:09:22,080
but these doesn't mean our predecessors

212
00:09:26,710 --> 00:09:24,480
were fools it's like the pieces of a

213
00:09:27,960 --> 00:09:26,720

puzzle that they hand it on to you and

214

00:09:30,790 --> 00:09:27,970

me

215

00:09:34,470 --> 00:09:30,800

[Music]

216

00:09:36,710 --> 00:09:34,480

maybe in another hundred years or two

217

00:09:39,110 --> 00:09:36,720

people then may laugh at all we thought

218

00:09:41,269 --> 00:09:39,120

we knew but they'll be standing on our

219

00:09:44,710 --> 00:09:41,279

shoulders when they brag about how far

220

00:09:49,030 --> 00:09:47,269

you know that each generation learns a

221

00:09:51,509 --> 00:09:49,040

little bit more

222

00:09:54,150 --> 00:09:51,519

pulling back the curtain opening up the

223

00:09:56,550 --> 00:09:54,160

door but it's only when we're standing

224

00:09:59,990 --> 00:09:56,560

on the shoulders of giants we can see

225

00:10:02,829 --> 00:10:00,000

the things we didn't before

226

00:10:05,190 --> 00:10:02,839

herschel and hubble

227

00:10:07,030 --> 00:10:05,200

einstein boar pulling back the curtain

228

00:10:09,350 --> 00:10:07,040

opening up the door

229

00:10:11,590 --> 00:10:09,360

but it's only when we're standing on the

230

00:10:14,630 --> 00:10:11,600

shoulders of giants who can see the

231

00:10:19,190 --> 00:10:14,640

things we didn't before

232

00:10:20,949 --> 00:10:19,200

the aristotle said the world is above

233

00:10:22,949 --> 00:10:20,959

thank you so much ladies and gentlemen i

234

00:10:24,710 --> 00:10:22,959

would love to meet every one of you

235

00:10:26,710 --> 00:10:24,720

and if you want to collaborate please

236

00:10:29,260 --> 00:10:26,720

consider me at your your personal artist

237

00:10:39,350 --> 00:10:29,270

in residence thank you so much

238

00:10:44,389 --> 00:10:41,430

one last thing i wanted to let everyone

239

00:10:47,110 --> 00:10:44,399

know that uh if you are feeling musical

240

00:10:48,790 --> 00:10:47,120

if tim's got you in the mood to to sing

241

00:10:50,389 --> 00:10:48,800

along or play an instrument we're gonna

242

00:10:52,150 --> 00:10:50,399

head down to the lobby and see if we can

243

00:11:05,269 --> 00:10:52,160

annoy people down there with more

244

00:11:09,670 --> 00:11:07,990

yeah come on down if if you're i see you