

# Probability & Music

7th Grade Math and Music

## CORE SUBJECT AREA

Math

## ART FORM + ELEMENTS

Music

Form, Expression, Style

## MSCCR STANDARDS

CCSS.MATH.CONTENT.7.SP.C.6

CCSS.MATH.CONTENT.7.SP.C.7

CCSS.MATH.CONTENT.7.SP.C.7

CCSS.MATH.CONTENT.7.SP.C.7.B

## MSCCR CREATIVE ARTS STANDARDS

MU: Pr4.2.7 (a. b. + c.)

MU: Re7.1.7

## MATERIALS NEEDED

Individual size M&M bags (1 per student), Chromebook (1 per 1-2 students), “Probability with M&Ms” handout, pencils, calculators, index cards, 2 different-colored markers

## DURATION

2-3 class periods

## LESSON SEQUENCE

TTW distribute index cards at the door, as students enter the class. Each card should have a star or diamond, in either green or yellow. These shapes and colors should be randomly drawn on the cards prior to class.

TTW discuss with the class that some things happen randomly, meaning there was no specific plan as to or how they happened. (i.e. who got what card at the door, when entering the classroom) TTW ask TS who have a star to stand, she will discuss the probability (or chance) of selecting a student from the class (or population) who has a star. She should write the fractional probability on the board. TTW discuss that the denominator is the total population, and that the numerator is the favorable outcome (what the question is asked about...i.e. stars). She should continue this process: yellow stars, green stars, diamonds, yellow diamonds, and green diamonds. TT should collect index cards to use with the remaining classes.

Day 1:

We are now going to create our own data by conducting an experiment. TTW then discuss the M&M experiment, focusing on the importance of following directions during an experiment. She will distribute handouts and individual packs of M&M’s. TTW instruct students to NOT open their bag until instructed to do so. TTW use the anchor charts on “Theoretical and Experimental Probability” to briefly define the difference. She will then walk

## OBJECTIVES

Students will use diagrams to demonstrate the chance of an event occurring.

Students will compare musical pieces to identify patterns in probability.

Students will gather data and determine relative frequencies.

Students will state probabilities in fractional form.

## VOCABULARY

probability, experimental and theoretical probability, population, chance event, relative frequency, contrasting music, pica, tempo, rests, accents, volume, tree diagrams

## RECOMMENDED RESOURCES

<https://www.ocabulary.com/unit/probability/video/Assessment>

[https://www.youtube.com/watch?v=B\\_8-B2rNw7s](https://www.youtube.com/watch?v=B_8-B2rNw7s)  
“Music for Changes” by John Cage

<https://www.youtube.com/watch?v=E0e60GEvD9U>  
“Dice Game Minuet” by Mozart

students through the experiment “Probability with M&M’s”. This experiment works best if TT has the document projected on the board and conducts the experiment with TS. TT should stop at each question, read the question aloud, allow 2-5 minute wait time, go over results, and then move to the next step. The final question should be the TS assessment piece. When TS gets to the final question they may eat their M&M’s. If students are unfamiliar with tree diagrams, TT may have to discuss and illustrate for TS.

Day Two:

Today, we are going to look at probability in Music. TTW walk students through the “Music and Probability” slides. She will discuss probability models, chance events, and how to compare two pieces of music. TTW use the Mozart dice table to assess TS understanding of how probability is set up, and how to solve frequencies from gathered data.

- It is important that TT work through the questions prior to presenting to the class.
- The music in the slides does not attach to a link, so the links are provided for you under resources.

You only need to play a short clip in order for TS to get an understanding. Assessment: TSW complete the music video, vocabulary game and quiz on the web-based site ‘Flocabulary’ under ‘Probability’ as the assessment piece of this lesson. The link is located under resources.

## EXTENDED LEARNING ACTIVITIES

This could be played along with the “Music and Probability” slides, for further clarification:

<https://www.youtube.com/watch?v=K6HcxxAWLoY> “Making Music with Dice” There is an interactive powerpoint attached if students need further instruction on theoretical and experimental probability.

## SOURCES

‘Music and Probability’ slides were downloaded from an anonymous web-based site. Assessment is by “Flocabulary”. M&M Experiment: Teachers pay Teachers lesson created by Smart Chick Teaching Resources (Edited by Melanie Pittman) adapted by Jessica Jarman

## TIPS + FREQUENTLY ASKED QUESTIONS

TT should prepare index cards for the ‘Engagement’ piece of the lesson the day(s) prior to administering the lesson. She should look through the ‘Music and Probability’ slides and educate herself on anything foreign. -TT should read through all questions in the M&M experiment.