Unit Title: Let's Explore Probability!
Grade Level: 6th Grade
Subject Area: Math
Duration/Length/Number of class periods: 11 class periods
Description: *In this unit students will receive an introduction of probability. Students will determine sample spaces of various events. Students will learn how to determine theoretical and experimental probabilities of various events. They will also conduct experiments, represent probabilities in various ways, and make predictions about events when probabilities are unknown.*

Established Goals (National, State, Local):

MN Math Standards 6.4.1.2 – Determine the sample space for a given experiment and determine which members of the sample space are related to certain events. Sample space may be determined by the use of tree diagrams, tables, or pictorial representations.

MN Math Standards 6.4.1.2 – Determine the probability of an event using the ratio between the size of the event and the size of the sample space; represent probabilities as percents, fractions, and decimals between 0 and 1 inclusive. Understand that probabilities measure likelihood

MN Math Standards 6.4.1.3 – Perform experiments for situations in which the probabilities are known, compare the resulting relative frequencies with the known probabilities; know that there may be differences.

MN Math Standards 6.4.1.4 – Calculate experimental probabilities from experiments; represent them as percents, fractions, and decimals between 0-1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown

What **Enduring Understandings** are desired?
- People can participate in informed decision making, by using their knowledge of probabilities and the likelihood of various events occurring.
- Although probabilities can be predicted, the result may be different than the original thought. We cannot always say with certainty what is going to happen, even if the odds favor a specified result.

What **Essential Questions** will be considered?
- How can we use our knowledge of probability to predict events?
- How does the use of sampling give us insight into the outcomes at a much larger scale?
- Why can we represent probabilities in different ways (fractions, decimals, percents)?
- To what extent can we predict with certainty the outcome of something?

- How do theoretical probability and experimental probability differ?			

Students will know / be able to:
- Students will determine the sample space for a given experiment using tables, tree diagrams, or pictorial representations.
- Students will determine theoretical probability of an event using the ratio between the size of the event and the sample space.
- Students will represent probabilities as percents, fractions, and decimals between 0 and 1.
- Students will understand that probabilities measure likelihood.
- Students will perform experiments for situations in which the probabilities are known.
- Students will compare the resulting relative frequencies with the known probabilities.
- Students will calculate experimental probabilities from experiments.
- Students will make predictions when actual probabilities are unknown using experimental probabilities.

Description	Formative	Summative	Introductory Activity	Learning Activity	Student Technology Used	Teacher Technology Used	ISTE Standards
Day 1 – Warm up Probability continuum – teacher poses students with different events such as winning the lottery, having chicken for lunch, doing a math problem during math class etc. Students either physically (or digitally) move themselves on a continuum with the following labels Impossible, unlikely, equally likely, likely, certain.			x		Device Shared powerpoint	Shared powerpoint	6c
Day 1 – Lesson – Teacher lesson/Lesson video and interactive notes sheet for lesson 12-1 "I can estimate the likelihood of an event to write and compare probabilities"				x	Device/video online textbook	Smart notebook	1c
Day 1 – Exit Activity/Homework Desmos activity	X				Device Desmos	Desmos	3d
Day 2 – Warm up Students will use quizlet to practice matching the same probabilities written different ways (fractions, decimals, percents). How to convert fractions, decimals, and percents was taught in a previous unit, so this should be review.	X				Quizlet	Quizlet	3c
Day 2 – Lesson – Teacher lesson/Lesson video and interactive notes sheet for lesson 12-2 "I can find the experimental probability of an event."				x	Device/ video Online textbook	Smartnotebook	1c
Day 2 - Exit slip – Microsoft forms, identifying probabilities from experiments by writing as a fraction, decimal, and percent	X				Device Microsoft Forms	Microsoft Forms	
Day 3 – Warm up –Students pick a card from a deck of cards as they enter the room. As a large group make three different data tables with their results (color, suit, number). Have small groups practice writing experimental probabilities based on their data tables. Discuss the accuracy of these probabilities in a large group. If online, students can use the following website to draw a card and collaborate on a shared word document http://random-cards.com/1-shuffled-deck/				x	Possibly word doc/random card website		7c

Activity					Resources	Tool	Code
Day 3 – Lesson – Teacher lesson/Lesson video and interactive notes sheet for lesson 12-3 "I can use counting methods to find all possible outcomes."				x	Device/ video Online textbook	Smartnotebook	1c
Day 3 – Exit Slip – Desmos activity	X				Desmos	Desmos	3d
Day 4 – Warm up – Mid chapter quiz from curriculum	x				Schoology	Schoology	
Day 4 – Lesson – Teacher lesson/Lesson video and interactive notes sheet for lesson 12-4 "I can find the theoretical probability and the compliment of an event."				x	Device/ video Online textbook	Smartnotebook	1c
Day 4 – Exit Slip – Have students write two different theoretical probability questions and answers involving rolling one die. Students will submit on forms. Teacher will select some of these questions to use in the warm up activity the following day.	X				Device Microsoft forms	Microsoft Forms	
Day 5 – Warm up – Use results from exit slips to create a quiz on schoology	X				Schoology	Schoology	1c
Day 5 Lesson – Teacher lesson/Video and interactive notes sheet "I can compare relative frequencies and find the difference between experimental and theoretical probabilities" ****Make sure to emphasize that it is possible experimental probabilities will not match the theoretical probabilities. Have a discussion about why this is.**				x	Device/ video Online textbook	Smartnotebook	1c
Day 5 –Exit Slip – Microsoft forms	x				Device Microsoft forms	Microsoft forms	
Day 6 – Warm Up – Predicting activity – Have a data table on the board that represents an experiment with only a few trials. In the table make one of the options significantly larger and one significantly smaller than the rest. Have students make predictions on what the new data table would look like if more trials were conducted. At the end of the discussion			X				
Day 6 – Lesson – Teacher lesson/Lesson video and interactive notes sheet for lesson 12-6 "I can use probability to predict events."				x	Device/ video Online textbook	Smartnotebook	1c
Day 6 – Exit Slip – Microsoft Forms	x				Microsoft Forms	Microsoft Forms	
Day 7 – Warm up – end of chapter quiz from curriculum	x				schoology	schoology	1c
Day 7 – Lesson – Teacher lesson/lesson video and interactive notes sheet "I can use probability to predict events using ratios."				x	Device video	Smartnotebook	1c
Day 7 – Intro of Probability Prediction Project – Students will work in small groups or partners for this project. Students will have two choices: - Choice one is to use sampling/surveying of their classmates to make predictions about their entire grade/school. Subject of their surveys can be student choice. - Choice two is to research how sampling is used to make predictions in the real world. Regardless of which option is chosen, students will give a short presentation (5 minutes or so) about what they learned, the results of their surveys (if applicable), and the predictions that were made. Students can make a poster, write a short speech, develop a PowerPoint presentation, make a skit, or any other teacher approved mode of delivery.				X	Device, Internet sources Word Powerpoint Forms		3d 6a 6c 7b 7c

Day 8 – Probability Prediction Project Work time				x	Same as above		Same as above
Day 9 – Review day using Quizizz Live – Students will answer questions independently and point totals will be added for group members. After everyone is finished, go over commonly missed questions based on report given at the end.	x				Quizizz	Quizizz	1c
Day 10 – District common assessment for Ch 12		x				Powerpo int	
Day 11 – Share probability prediction projects				x	Varies		6a, 6b, 6c, 6d

Materials, tools and resources:
- Holt McDougal Mathematics Course 1 Curriculum – Ch 12
- Smartnotebook – lesson slides and video creation
- Schoology – deliver content to students, some quizzes will be located here
- Quizlet, Day 2 Warm Up
- Desmos, Day 1 Exit Activity/Homework, Day 3 Exit Slip
- Microsoft Forms, Day 2 Exit Slip, Day 4 Exit Slip, Day 5 Exit Slip, Day 6 Exit Slip
- Microsoft Powerpoint, Day 1 Warm Up, Ch 12 assessment
- Quizizz, Day 9 Review Quizizz

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