Curriculum Sample Template
Max. 8 Pages

Grade Level	7	**Content Area**	Mathematics
Course Title (grades 9-12 Only)			
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	Students will understand basic principles of random sampling, the process of collecting data, and how to organize data in tables and histograms. Students will also understand ratios and proportional reasoning.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	Sierra Preparatory Academy will use the Connected Mathematics Program developed by Michigan State University and the National Science Foundation which employs a Socratic method of instruction that is mapped directly to the Common Core standards. *(Some activities of the following lesson are adapted from Mathwire.com and pms-math lessons.)*		
Standard Number and Description *List the Number* and the full description for the Required Standard or Science Performance Objective listed in section A.6.*	7.SP.2 Grade: 7 Domain: Statistics & Probability (SP) Cluster: Use random sampling to draw inferences about a population Standard: #2 - Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*		
Materials/Resources Needed	6-sided die for each set of partners, data recording sheets, overhead projector/whiteboard for recording brainstorming and class plot line. Also "mystery bags" prepared with colored chips.		

**** Standard Number**: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Standard (e.g., 6.EE.7). For HS Math, use Conceptual Category-Domain, Standard (e.g., A-REI.6). For Science, use Grade, Strand, Concept, PO (e.g., 4.1.3.1).*

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Lesson (add as needed)	**Instructional Strategies**	**Student Activities**
1	This is a three day curriculum sample. Day 1 The teacher will review concepts of sampling and then will present the following scenario: Many companies are putting toys in their products to try to get customers to buy more. The company that makes Cheerios thinks this might be a good way to get families to buy more boxes of Cheerios. They will make six different toys and put one in each box of Cheerios. That way children will want their parents to keep buying Cheerios until they have all six different toys. The President of Cheerios asks the class to help figure out if this is a good plan. She knows that it will cost more to put toys in Cheerios, but she wants to be sure that families will really buy more boxes of Cheerios to get the toys. The question she needs answered is: How many boxes will a family buy to be sure they collect all 6 toys? The teacher will then explain and lead students through a simulated experiment by modeling data collection according to the following process:	Students will begin by brainstorming answers to the question of how many boxes of Cheerios will need to be purchased in order to collect all 6 toys. Students should write all of their "guesstimates" on the board for later reference. Students will work with partners. One partner should toss the die, and the other partner should record the result in the tally chart. Both partners should add the tally marks at the end, total the numbers and mark this total on the class line plot. Students should trade places and repeat the experiment.

	The teacher will toss a 6-sided die and use the results to determine which of the 6 toys one might get in a box of Cheerios. If a 3 is rolled, you got Toy #3, etc. The teacher will make a tally mark next to this number on the recording sheet. The teacher will repeat the process and explain to students that they must keep a tally chart of all of the toys they get and that they must keep tossing the die until they get every toy. As soon as they get the last toy, they should stop and count all of the tallies to see how many boxes they had to "buy" to get all 6 toys. The teacher will distribute dice and recording sheets to all partners and circulate around the room as students start to work. The teacher will distribute **Assessment #1**.	**Class Discussion:** When all data has been recorded on the class line plot, students will put away materials and examine the line plot. Ask partners to discuss this problem and be prepared to give an answer and explain why they think that is the right number. Partners will report their explanations to the class, and the class will eventually come to a consensus on the correct answer. Homework: See **Assessment #1** – Students will independently complete a worksheet of problems involving random sampling.
2	Day 2 The teacher will begin by reviewing, discussing, and grading the homework with the students. Once the homework has been reviewed, the teacher will introduce **Assessment #2** - the Mystery Bag Activity, the results for which will be graded. • The teacher will prepare four bags with the appropriate number of different colored chips. The bags will only be marked A, B, C, D. The teacher will also prepare index cards	Before beginning the day's lesson, students will turn in homework from the night before and will grade it with the teacher. Students will then begin **Assessment #2** – The Mystery Bag Activity. • Without looking in the bag, students should each draw one tile from Bag A. They should record the color of the tile drawn. Replace the tile before drawing the next tile. Students should draw and record a total of six tiles from Bag A.

	that list facts about each bag. • The teacher will distribute a set of bags and index cards to each group of students, and an answer sheet to each individual student. • As students finish their answer sheets, the teacher will circulate and grade each sheet. Once all students have completed the activity, the teacher will lead the class through a discussion of the correct answers and ask students to explain how they arrived at their conclusions.	• Students should repeat this process with each of the bags. They should record information separately for each bag. • Students must then decide which index card is the correct label for which bag. On their answer sheet, students should match each of the card labels with each of the bags and turn in their answer sheets.
3	Day 3 – Summative **Assessment #3** - Unit Quiz	Students will independently complete the unit quiz (see **Assessment #3**).

Summative Assessment Items: *Attach here.* For each summative assessment item, include an answer key or scoring rubric describing how points are to be awarded.

Assessment #1 – Homework (to be completed independently)

Name: _____

1. Ms. Julian wants to order pencils for the school store. Pencils come in four styles: plain, star, ”Happy Birthday”, and scented. She randomly surveyed 50 students to determine which color notebook they would buy. The table below shows the results.

Pencil Style **Votes Color**	Plain	Star	Happy Birthday	Scented
Number of Votes	16	22	5	7

Ms. Julian will order 800 pencils. How many star pencils should she order?

2. The Orioles won 6 out of their 8 pre-season games. So far, they have won 39 games in the regular season. How many total regular season games have they played?

3. One hundred randomly selected students from Parkville High School were surveyed to determine whether they would like lunch to last thirty more minutes. Of the students surveyed, 38 favored the change. Parkville High School has 1,600 students. According to the survey results, how many students would favor the change?

4. In order to go through a toll, you must either use EZ Pass or pay in cash. A company conducted a random survey of 100 commuters to determine how they paid their toll fare. The survey results are shown in the table below.

Toll Payment Survey Number of People Who Use Cash	**Number of People Who Use EZ Pass**
63	37

Mr. German, a tollbooth attendant for I-95, reported that 44 drivers through his booth one morning paid using a EZ Pass. Based on this survey, estimate how many drivers passed through his booth that morning. Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

5. There are 413 dolphins in an enclosed marine sanctuary. Scientists capture, tag, and release 30 dolphins. A month later, the scientists capture 100 dolphins. How many dolphins should the scientists expect to have tags? Round the answer to the nearest whole number.

6. Julia rolled a standard number cube 70 times and recorded her results in the table below.

Results of 50 Rolls	
Number	**Frequency**
1	13
2	7
3	10
4	12
5	9
6	19

Based on the results in the table, how many times should Julia expect to roll a 4 or 5 if she rolls the number cube 600 times?

7. 75% of students surveyed went to the beach this summer. If there are 1150 students in your school, about how many would be expected to have gone to the beach?

Homework Answer Key and Scoring Rubric

1. 352 star pencils (3 points)
2. 52 regular season games (3 points)
3. 608 students (3 points)
4. Approx. 119 drivers (3 points) (explanation worth 5 points)
5. 7 deer (3 points)
6. 180 times (3 points)
7. Approx. 862 students(3 points)

Total Points Possible: 26 points
Mastery: 22 points (≈85%)

Assessment #2 – The Mystery Bag Activity

Bag A	**Bag B**
5 red 1 yellow 5 blue 1 green	1 red 5 yellow 1 blue 5 green
Bag C	**Bag D**
3 red 3 yellow 3 blue 3 green	2 red 6 yellow 2 blue 2 green

Card #1	**Card #2**
This bag has more yellow chips than any other color.	This bag has more red and blue chips than yellow and green chips.
Card #3	**Card #4**
This bag has equal numbers of each color.	This bag has more yellow and green chips than blue and red chips.

Answer Key (5 points each):

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Bag A: Card #2
Bag B: Card #4
Bag C: Card #3
Bag D: Card #1

Total Points Possible: 20 points
Mastery: 20 points*

*Because of the nature of the activity, 85% is not a possible score. Once the third bag has been correctly identified, the fourth must automatically be correct as well, making 100% the appropriate score for mastery.

Assessment #3 – Unit Quiz

Name: _____

1. The Student Council Advisor will survey 50 students to determine which after school activities to run next year. The Student Council Advisor will use one of the methods below.

Method A: Survey the first 50 students who enter the cafeteria on a randomly selected day.

Method B: Have 25 teachers each randomly select 2 eleventh-grade students to be surveyed.

Method C: Assign each student a number. Use a random number generator to generate 50 numbers. Survey those students whose numbers are generated.

A. Which method will provide the Student Council Advisor with a simple random sample of the student population? Use principles of simple random sampling to justify your answer.

B. Use principles of simple random sampling to justify why each of the other two methods does not provide a simple random sample.

2. In a large city, 300 randomly sampled registered voters were asked to state who they would vote for in the next local election. The table below shows the results of the survey.

Voter Survey Results		
Candidate A	**Candidate B**	**Undecided**
150	106	44

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There are 10,000 people expected to vote in the next election. Based on the data, how many people will vote for Candidate A in the next election?

A. 1,467
B. 3,533
C. 5,000
D. 50,000

3. Jennifer owns a jewelry store. She wants to survey her costumers in order to determine who has heard the new radio advertisement for her store.

A. Survey customers who live near her store.
B. Survey customers who shop at her store on weekends.
C. Survey customers who shop at her store early in the morning.
D. Survey customers who shop at her store at different times throughout the week.

4. The Eighth-grade Advisor is conducting a survey to determine music preferences for the graduation slideshow. The Advisor decides to survey the first 100 students that enter the school on Friday. Which of these best describes why this type of sampling may give biased results?

A. The sample size is too small.
B. Students are randomly selected.
C. Not all students have the same chance to be surveyed.
D. Every other student entering the school should be surveyed.

Unit Quiz Answer Key and Scoring Rubric

1. A. Method C will provide the Student Council Advisor with a simple random sample. Every student is equally likely to be chosen and students are chosen independently of each other. (5 points)

B. Method A is not a simple random sample because not everyone is equally likely to be chosen. Students who are absent that day or do not get to the cafeteria early cannot be picked. Method B is not a simple random sample because everyone is not equally likely to be picked. Only eleventh graders will be surveyed. Other grades will not be represented. (10 points)

2. C (2 points)
3. D (2 points)
4. C (2 points)

Total Points Possible: 21 points
Mastery: 18 points (≈85%)

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