



<b>Program Information</b>	<i>[Lesson Title]</i> <b>Starburst Probability</b>		<b>TEACHER NAME</b> Cheryl Siegel		<b>PROGRAM NAME</b> Parma City School District			
	<i>[Unit Title]</i> <b>Data Analysis</b>		<b>NRS EFL(s)</b> 4		<b>TIME FRAME</b> 40 minutes			
<b>Instruction</b>	<b><u>OBR ABE/ASE Standards – Mathematics</u></b>							
	<b>Numbers (N)</b>		<b>Algebra (A)</b>		<b>Geometry (G)</b>		<b>Data (D)</b>	
	Numbers and Operation		Operations and Algebraic Thinking		Geometric Shapes and Figures		Measurement and Data	
	The Number System		Expressions and Equations		Congruence		Statistics and Probability	<b>D.4.6</b>
	Ratios and Proportional Relationships		Functions		Similarity, Right Triangles. And Trigonometry			
	Number and Quantity				Geometric Measurement and Dimensions			
					Modeling with Geometry			



<b>Mathematical Practices (MP)</b>	
<input type="radio"/>	Make sense of problems and persevere in solving them. (MP.1)
<input checked="" type="radio"/>	Reason abstractly and quantitatively. (MP.2)
<input type="radio"/>	Construct viable arguments and critique the reasoning of others. (MP.3)
<input checked="" type="radio"/>	Model with mathematics. (MP.4)
<input type="radio"/>	Use appropriate tools strategically. (MP.5)
<input type="radio"/>	Attend to precision. (MP.6)
<input type="radio"/>	Look for and make use of structure. (MP.7)
<input type="radio"/>	Look for and express regularity in repeated reasoning. (MP.8)
<p><b>LEARNER OUTCOME(S)</b></p> <ul style="list-style-type: none"> <li>Students will be able to understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring by completing a set of problems with 80% accuracy.</li> </ul>	<p><b>ASSESSMENT TOOLS/METHODS</b></p> <p>Formative:</p> <ul style="list-style-type: none"> <li>Instructor will circulate the room during independent work on worksheets and throughout the activity to determine whether students understand the concepts or require supplemental instruction. Questioning techniques to elicit responses that explain the how and why of the process of determining probability will be implemented.</li> </ul> <p>Summative:</p> <ul style="list-style-type: none"> <li>Instructor will collect <i>Starburst Probability Activity Worksheets</i> (attached) at the end of class to review and determine which students, if any, require supplemental instruction.</li> </ul>
<p><b>LEARNER PRIOR KNOWLEDGE</b></p> <ul style="list-style-type: none"> <li>Students must know how to create and reduce fractions.</li> </ul>	



INSTRUCTIONAL ACTIVITIES	RESOURCES
<ol style="list-style-type: none"><li>1. Begin the class with an anticipatory set by asking: “Who likes Starburst?” “How many of you have a favorite flavor of Starburst and will go looking for that one color?” Then introduce the lesson: “Today we’re going to talk about the chances of pulling your favorite flavor out of a bag of Starburst without looking. There are two things we need to know to answer this question. The first thing we need to know is how many pieces of candy there are. We also need to know how many of the pieces are your favorite flavor. We are going to be using these ideas and the Starburst to explore probability today (and yes, you will get to eat some).”</li><li>2. Referencing <i>Starburst Probability Definitions</i> (attached), write the definition of probability on the board and have students write it down. Show the fractional form of a probability as favorable outcomes over total outcomes. Define outcomes. Students copy.</li><li>3. Discuss how outcomes can also be written as decimals or percents.</li><li>4. Distribute <i>Starburst Probability Examples Worksheet</i> (attached) to students and work with them to complete examples 1-5.</li><li>5. Have the students complete examples 6-10 independently and then go over answers together.</li></ol>	<p>Pens/pencils</p> <p>Large bag of Starburst candies (enough for the class)</p> <p>Paper bags (one for each student pair)</p> <p>Computers with internet access (for students)</p> <p><i>Starburst Probability Definitions</i> (attached)</p> <p>Student copies of <i>Starburst Probability Examples Worksheet</i> (attached)</p> <p>Student copies of <i>Starburst Probability Activity Worksheet</i> (attached)</p> <p>Scholastic Study Jams: Probability as a Fraction Activities. (n.d.). Retrieved from <a href="http://studyjams.scholastic.com/studyjams/jams/math/probability/probability-fraction.htm">http://studyjams.scholastic.com/studyjams/jams/math/probability/probability-fraction.htm</a></p> <p>Khan Academy: Simple Probability Practice Problems. (n.d.). Retrieved from <a href="https://www.khanacademy.org/math/precalculus/prob_comb/basic_prob_precalc/e/probability_1">https://www.khanacademy.org/math/precalculus/prob_comb/basic_prob_precalc/e/probability_1</a></p>



	<ol style="list-style-type: none"><li>6. Pair up students and distribute Starburst candies in paper bags and copies of <i>Starburst Probability Activity Worksheet</i> (attached) to each student pair. Explain Starburst activity and rules (listed on handout).</li><li>7. Students work together in pairs to complete the worksheet using their Starburst. As students work, the teacher should walk around to check on students and make sure they are getting the correct answers.</li><li>8. When students have finished, discuss the results, especially what happened to their fractions after eating two.</li><li>9. Have students log onto the computers. They will have the option of either more practice with step-by-step instruction, or they can take an assessment to test their skills. They will go to the Scholastic Study Jams page and use the <a href="#">Probability as a Fraction</a> activity.</li><li>10. Instructor will collect <i>Starburst Probability Activity Worksheets</i> to review prior to the next class. Students requiring additional support will be instructed to use the computer to view supplemental instruction videos and complete practice problems on <a href="#">Khan Academy's Simple Probability</a> page.</li></ol>	
	<p><b>DIFFERENTIATION</b></p> <ul style="list-style-type: none"><li>• Struggling students can be paired up with a knowledgeable student and receive more help from the teacher while others are working in pairs.</li><li>• Students who need more practice can use the <a href="#">Scholastic page</a> to do step-by-step practice.</li><li>• Students can also have the option of watching the <a href="#">Khan Academy videos on Probability</a> and working through the <a href="#">Simple Probability practice problems</a>.</li></ul>	



Adult Basic & Literacy Education

<b>Reflection</b>	<b>TEACHER REFLECTION/LESSON EVALUATION</b>
	<b>ADDITIONAL INFORMATION</b>

## **Definitions:**

Probability- the likelihood of an event occurring, expressed as a number from 0 to 1.

Theoretical Probability — When all outcomes are equally likely, the theoretical probability of an event is the ratio of the number of favorable outcomes to the number of possible outcomes.

Outcomes- possible results of an experiment (heads or tails on a coin)

Favorable Outcome- the particular result that we are looking for (just heads)

Impossible= 0 or 0%

Equally likely= .5 or  $\frac{1}{2}$  or 50%

Always= 1 or 100%

# Starburst Probability Examples

All dice have 6 sides labeled 1-6 unless otherwise stated.

All decks have 52 cards, 13 of each suit.

Coins have a head and a tail and cannot land on their edge.

## EXAMPLES:

1. Heads on a coin
2. Two on a die
3. Ace in a deck
4. Even number on die
5. Not 3 on a die
6. Seven of Spades in a deck
7. Red card in a deck
8. Hearts in a deck
9. Eight on a die
10. Number greater than 4 on a die

## **Starburst Activity & Rules:**

### **RULES:**

1. DO NOT EAT any Starburst until instructed.
2. No sharing or stealing candy.
3. Throw away your wrappers at the end of class.
4. Take turns answering questions. (Groups of 2)

If you cannot follow these rules, you will complete the worksheet by yourself without candy.

You will need:

- a paper bag of starburst
- a worksheet for each person
- pencils



# Starburst Probability

Name: \_\_\_\_\_

Answer the following questions about your bag of Starburst. Write your answers as a fraction in lowest terms.

1. How many of your Starburst are: red? \_\_\_\_\_

pink? \_\_\_\_\_

yellow? \_\_\_\_\_

orange? \_\_\_\_\_

2. How many total Starburst do you have? \_\_\_\_\_

3. If you were to pick a piece of candy from the bag without looking, what is the probability that you would pick a piece that was:

red? \_\_\_\_\_

pink? \_\_\_\_\_

yellow? \_\_\_\_\_

orange? \_\_\_\_\_

green? \_\_\_\_\_

not yellow? \_\_\_\_\_

4. Which colors have equal probability of being chosen? pink or red? \_\_\_\_\_  
\_\_\_\_\_

**Now each person may eat TWO pieces of candy.**

5. Now, how many of your Starburst are: red? \_\_\_\_\_

pink? \_\_\_\_\_

yellow? \_\_\_\_\_

orange? \_\_\_\_\_

6. Now, if you were to pick a piece of candy from the bag without looking, what is the probability that you would pick a piece that was:

red? \_\_\_\_\_

pink? \_\_\_\_\_

yellow? \_\_\_\_\_

orange? \_\_\_\_\_

7. Why did the probability change after you ate some of the candy?

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