**Mission: Possibility of Probability**

For further information contact...

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Bartow, FL 33830  
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**PROGRAM OVERVIEW**

I noticed the subject of probability is typically the hardest for students to understand, especially when teaching with paper-pencil activities. This program is designed to enhance student learning of probability in an innovative, multi-sensory approach through interactive, hands on, cross-curriculum learning activities.

Agent 007 Mission

Agent 007, your help is needed to insure understanding for all. This mission, possibility of probability is TOP SECRET. If, for some reason, you are unable to complete this assignment, you will be considered “Missing in Action”. There will be no record of your success for this mission. Your abilities will be unknown. NOW... Choose Your Mission!!!

Mission 1: Coin Toss  
Mission 2: Probability  
Mission 3: Colored Chips  
Mission 4: 10 Chips  
Mission 5: Spinners

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**OVERALL VALUE**

- This program excites and entices student learning.
- It is presented in an exciting, hands-on and dramatic way so that students who are usually unenthusiastic about math are engaged in learning about probability.
- The program also promotes cross-curricular integration by using reading, vocabulary, and higher level thinking skills to solve missions.
- Can encourage learning in an innovative, creative, cross-curricular way that is easy to implement.

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**LESSON PLAN TITLES**

- Day One  
- Day Two

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**MATERIALS**

- An average sized brief case.  
- CD player with head set (Please note that although I chose to use a CD player with the music and directions, it is not necessary. The directions are written out and the activities can be completed without the use of the CD player.)  
- Probability manipulatives such as colored chips, cubes or marbles, and coins  
- Activity pages  
- Colored folders  
- Envelopes  
- Vis-à-vis markers

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**ABOUT THE DEVELOPER**

Lois Langston has a B.S. in Elementary and Early Childhood Education. She is also National Board Certified. Lois has been teaching in Polk County for 13 years and is currently teaching 2nd grade at Bartow Elementary Academy.
SUBJECTS COVERED
Math

GRADES
Kindergarten - Five

OBJECTIVES
1. Teaching Probability Vocabulary:
   - hypothesis, predict, certain, probable, impossible, more likely, less likely, equally likely.
2. Work in cooperative learning groups to learn and use vocabulary
3. Drawing the picture to match the vocabulary helps the child visualize the word for better understanding.

SUNSHINE STATE STANDARDS
MA.E.2.1.1.2.1: The student knows the likelihood of a given situation
MA.E.2.1.2.2.1: The student knows if a given event is equally likely, most likely or least likely to occur
MA.E.2.1.1.2.3: The student records results of activities involving chance and makes predictions based upon data

MATERIALS
- Pretest
- Probability Vocabulary Word Cards and Definitions
- Vocabulary Notebook (on going throughout the year in all subjects)
- Plan white paper divided into 8ths.
- Pencils/Crayons

DIRECTIONS
1. First give the pretest to set a baseline for growth.
2. Then, teach probability vocabulary
   - The children write the vocabulary word and definition in notebook.
   - Discuss the word and meaning
3. Next, Practice using probability vocabulary
   - The children play a Kagan cooperative learning strategy called Mix, Pair, Share. I have written the vocabulary words and definitions on cards; (Enough for every child to have a word or definition). I would give each child either a vocabulary word or a definition. They would not allow anyone to see their card until they are finding their pair. As I play the Mission Impossible theme song, I would have the children “Mix” up and then find their pair (Match). The student with the word would find the student with the correct definition. Once everyone has found their match, then I would stop the music. The pairs would “share” what their card said and then each child would take turns sharing with the class. We would play this a couple of times, making sure the cards were mixed up and distributed again to different students. I use this strategy to help the children become more familiar with the words and definitions.
4. Then, review probability vocabulary words and definitions.
   - Students read each word and definition to their neighbor.
   - The students use another Kagan cooperative learning strategy called Numbered Heads Together. Write a probability scenario on the board. I would have the children get their heads together to discuss which vocabulary word would best fit that scenario. For example: There are 8 red marbles and 2 blue marbles in a jar. It is ______ that you will pick a green marble. The students would put their heads together and discuss the scenario. They would choose a word that they agree would best complete the sentence. Then I would call on groups to tell me what they think the answer would be. In this case, the answer would be impossible. They should be able to tell me why it would be impossible for someone to pick a green marble. I would do this strategy a few more times until I was sure the students had mastered the vocabulary.
5. Last, assess mastery of vocabulary words
   - Give students a short vocabulary matching quiz using a teacher created quiz that gives a scenario for each word and they would fill in the blank with the word that best completes the sentence.

EVALUATION/ASSESSMENT
- To show growth students take a teacher created pre and post test on probability
- Observation – Clear up any misconceptions
- Small group instruction – good for initial instruction of program

ADAPTABILITY
The program can be done in a small group setting with a teacher facilitating or can be used individually or in pairs as a math learning center. It could easily be adapted to fit many different class or learning levels.
“Mission: Possibility of Probability” Lois Langston

Lesson Plan No 2: Day Two

SUBJECTS COVERED
Math

GRADES
Kindergarten - Five

OBJECTIVES
1. Students use the vocabulary for probability to record & analyze data
2. To know when an event that is certain to happen will always happen and an event that is impossible will never happen.

SUNSHINE STATE STANDARDS
MA.E.1.1.1.2.4: The student uses mathematical language to read and interpret data on a simple chart.

MATERIALS
- Probability Vocabulary Word Cards and Definitions
- Brief Case of Probability materials: CD player; CD with music and directions
- Folders with activities
- Probability materials: colored chips, coins, spinners etc...
- Vis-à-vis markers and napkins

DIRECTIONS
1. In small, teacher directed learning groups; introduce the brief case containing all of the experiments. Explain how to use each part of the program. Review the vocabulary with the group. Explain the “Missions”.
   - The students can choose: Mission 1: Coin Toss: How many times did it land on heads. Then they answer questions related to the table they completed. The questions include: How many times did you toss the coin? How many times did land on heads? How many times did it land on tails? Write a fraction to show how many times it landed on heads. Write a fraction to show how many times it landed on heads.
   - Mission 2: Probability: The students review the meaning of the words certain, probable and impossible. Then they complete the activity on the card. The students put 10 green chips and 5 yellow chips in a bag. They predict the color chip that will be pulled first. They will also decide what color will be pulled most. They need to remember to put the chip back in the bag after each pull. This activity is repeated until 10 pulls have been made. They then circle the word missing from each sentence:
     1. It is ____ that you will pick a yellow chip. (probable, impossible, certain)
     2. It is ____ that you will pick a red chip. (probable, impossible, certain)
     3. It is ____ that you will pick a yellow or green chip. (probable, impossible, certain)
   - Mission 3: Colored Chips: The students use a tally chart to help answer the questions. They circle the missing word to complete the sentence. (There is a tally chart on the activity page that shows 8 green chips and 18 red chips)
     1. There are more ___ chips in the box. (green, red)
     2. You can pick 1 chip. It is ___ that you will pick a red chip. (probable, impossible, certain)
     3. It is ___ that you will pick a yellow chip. (probable, impossible, certain)
   - Mission 4: 10 Chips: Students put 10 chips into a bag, and make a prediction. They pull 1 chip and mark the results on the tally chart and put the chip back into the bag. This activity is repeated for a total of 10 times. The student must remember to put the chip back into the bag before pulling another chip.
   - Mission 5: Spinners: The students decide what color the spinner is more likely or less likely to land on based on the colors of the spinner. They actually spin the spinner 10 times and tally how many times the spinner landed on each color.

2. Next, to assess mastery of each experiment, have the students complete each of the hands on, cross curriculum activities. Expect the students to use the vocabulary terms in context as they solve each mission.
3. Then, working as a facilitator, have the students work in groups of two to complete the missions. Help the students work out any misconceptions or confusion while facilitating.
4. Then, assess the learning gains made by giving the probability post test.
5. Last, place the brief case in a math center for further exploration. Continue to check for accuracy and misconceptions by observing the students while they are performing the missions.

EVALUATION/ASSESSMENT
To show growth students take a teacher created pre and post test on probability

Observation – Clear up any misconceptions
Small group instruction – good for initial instruction of program

★★★

2007 - 2008 IDEA CATALOG OF EXCELLENCE
# Understanding Probability

**Student name**

<table>
<thead>
<tr>
<th><strong>Beginning level:</strong></th>
<th></th>
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<tbody>
<tr>
<td>The students will begin to understand probability vocabulary (predict, more likely, less likely, equally likely, certain, probable and impossible) based on observation of the use of the words in context and a pre and post test on probability.</td>
<td>________</td>
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<td></td>
<td>1 - 25 pts</td>
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<table>
<thead>
<tr>
<th><strong>Developing level:</strong></th>
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</thead>
<tbody>
<tr>
<td>The students will begin to predict the outcomes of simple experiments and record data based on observation with the experiments and on a pre and post test on probability.</td>
<td>________</td>
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<td></td>
<td>26 - 50 pts</td>
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<table>
<thead>
<tr>
<th><strong>Accomplished level:</strong></th>
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</thead>
<tbody>
<tr>
<td>The students will understand an event that is more likely to happen will occur more often than an event that is less likely to happen; Understand how to record and analyze data collected from performing an experiment based on observation of the students performing the experiments and pre and post test on probability</td>
<td>________</td>
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<td></td>
<td>51 - 75 pts</td>
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<table>
<thead>
<tr>
<th><strong>Exemplary level:</strong></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>The students will be able to use the knowledge to correctly determine and understand what will happen in an event by applying knowledge learned when completing self directed experiments, observation, pre and post test on probability.</td>
<td>________</td>
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<tr>
<td></td>
<td>76 - 100 pts</td>
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</table>

**Total Points**

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2007 - 2008 IDEA CATALOG OF EXCELLENCE
## Materials Budget

<table>
<thead>
<tr>
<th>SUPPLIER</th>
<th>ITEM DESCRIPTION</th>
<th>COST</th>
<th>QUANTITY</th>
<th>TOTAL COST</th>
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<tr>
<td>Staples</td>
<td>Leather Look Attaché (brief case)</td>
<td>39.99</td>
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<td>39.99</td>
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<td>Staples colored file folders (100/box)</td>
<td>13.58</td>
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<td>Staples</td>
<td>6” x 9” brown Kraft clasp envelopes (100/box)</td>
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<td>Staples</td>
<td>Expo Vis-A-Vis Wet Erase markers (assorted 8/pk)</td>
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<td>Wal Mart</td>
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<td>Teacher Direct</td>
<td>Counters 7/8” stackable – pg 143</td>
<td>14.88</td>
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<td></td>
<td>* Teacher Direct shipping</td>
<td>.99</td>
<td></td>
<td>.99</td>
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<tr>
<td>ACE Educational</td>
<td>Probability Set – pg 179 (grades 2 - 6)</td>
<td>49.99</td>
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<td>Supplies</td>
<td>Bright colored bags – pg 376 (28 bags)</td>
<td>6.15</td>
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<td></td>
<td>Centimeter cubes (10 colors - set of 500) pg 174</td>
<td>11.95</td>
<td>1</td>
<td>11.95</td>
</tr>
<tr>
<td></td>
<td>* Free shipping for orders over $30.00</td>
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<td><strong>7%</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Shipping if applicable</strong></td>
<td>see above</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL BUDGET AMOUNT</strong></td>
<td><strong>$195.23</strong></td>
</tr>
</tbody>
</table>

Teacher’s Name  **Lois Langston**  
School: **Bartow Elem. Academy**
Coin Toss Tally Sheet

What is the probability of tossing a head or tail?
Record your tallies below:

<table>
<thead>
<tr>
<th>Coin Toss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heads</td>
</tr>
<tr>
<td>Tails</td>
</tr>
</tbody>
</table>

1. How many times did you toss the coin? ____________
2. How many times did it land on heads? ____________
3. How many times did it land on tails? ____________
4. Write a fraction to show how many times it landed on tails. ______
5. Write a fraction to show how many times it landed on heads. _____
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Additional Information

Name ______________________ Date __________________

Probability Pie Test

Words like certain probable and impossible tell about probability. Match the correct word to the definition.

1. ______ means that it will happen.
2. ______ means that it will most likely happen.
3. ______ means that it will not happen.

Use the spinner to answer the following questions.

If you were to spin once, which color is the spinner most likely to land on?

4. black white gray
   5. black white gray

6. black white gray
   7. black white gray

Problem Solving
Write more likely, less likely or equally likely to answer the question.

8. Will the spinner land on white?
Name ___________________________   Date ________________

Probability Pre Test
There are 10 blue chips and 5 green chips in a bag. Circle the missing word to complete the sentence.

1. It is _____ that you will pick a yellow chip.
   probable   impossible   certain

2. It is _____ that you will pick a blue chip.
   probable   impossible   certain

3. It is ____ that you will pick a blue or green chip.
   probable   impossible   certain

4. You can pick 1 chip. It is ____ that you will pick a yellow chip?
   probable   Impossible   certain

5. There are red or blue marbles in each jar. Color the marbles to match each description below each jar.

   It is certain to pick a red marble.   It is impossible to pick a red marble.
Probability Chips

It is **certain** that you will pick a yellow, green, blue or red chip.

It is **probable** that you will pick a green chip.

It is **impossible** that you will pick a pink chip.

**Try This:**

Put 10 green chips and 5 yellow chips in a bag. Pull out 10 chips and predict the outcome. Circle the missing word to complete the sentence.

1. It is ____ that you will pick a yellow chip.
   
   probable    impossible    certain

2. It is ____ that you will pick a red chip.
   
   probable    impossible    certain

3. It is ____ that you will pick a yellow or green chip.
   
   probable    impossible    certain

**Think About This:**

There are 5 blue chips and 20 red chips in a bag. Is it more probable to pick a blue chip or a red chip? ________________________________

Why? ______________________________________________________

____________________________________________________________
Directions: Use the tally chart to help you answer the questions. Circle the missing word to complete the sentence.

<table>
<thead>
<tr>
<th>Chips</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td></td>
</tr>
</tbody>
</table>

1. There are more _____ chips in the box.
   green     red

2. You can pick 1 chip. It is _____ that you will pick a red chip.
   probable  certain  impossible

3. It is _____ that you will pick a yellow chip.
   probable  certain  impossible

4. It is _____ that you will pick a green or a red chip.
   probable  certain  impossible

5. There are less _____ chips in the box.
   green     red
Directions: Put the 10 chips into the bag. Then make a prediction. Pull out one chip and mark the results. Then put the chip back into the bag. Do this 10 times. REMEMBER put the chip back into the bag before you choose again.

<table>
<thead>
<tr>
<th>Chips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
</tr>
<tr>
<td>Yellow</td>
</tr>
<tr>
<td>Green</td>
</tr>
<tr>
<td>Red</td>
</tr>
</tbody>
</table>
Directions: Let's predict what might happen! Look at the spinner and write the color that the spinner would more likely, less likely land on.

1. It is more likely that the spinner will land on ____________.

2. It is less likely that the spinner will land on ____________.

3. What color do you think the spinner will land on the most? ____________________________

4. What color do you think the spinner will land on the least? ____________________________

Now, Spin the spinner 10 times and tally how many times the spinner landed on:

- Green _______
- Blue _______
- Purple _______
- Red _______
- Yellow _______
“Mission: Possibility of Probability”  
Lois Langston

Additional Information

Predict
To make a guess about what will happen

Hypothesis
What you think will happen

An event may not happen
An event will surely happen
An event could happen
An event will not ever happen

Less Likely
Certain
More Likely
Probable
Equally Likely
Impossible
Probability Post Test
There are 10 blue chips and 5 green chips in a bag. Circle the missing word to complete the sentence.

1. It is _____ that you will pick a yellow chip.
   - probable
   - impossible
   - certain

2. It is _____ that you will pick a blue chip.
   - probable
   - impossible
   - certain

3. It is _____ that you will pick a blue or green chip.
   - probable
   - impossible
   - certain

4. You can pick 1 chip. It is _____ that you will pick a yellow chip?
   - probable
   - Impossible
   - certain

5. There are red or blue marbles in each jar. Color the marbles to match each description below each jar.

It is certain to pick a red marble. It is impossible to pick a red marble.
Words like certain probable and impossible tell about probability. Match the correct word to the definition.

6. __________ means that it will happen.  
7. __________ means that it will most likely happen.  
8. __________ means that it will not happen.

Use the spinner to answer the following questions.

If you were to spin once, which color is the spinner most likely to land on?

<table>
<thead>
<tr>
<th>9.</th>
<th>black</th>
<th>10.</th>
<th>black</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>white</td>
<td></td>
<td>white</td>
</tr>
<tr>
<td></td>
<td>gray</td>
<td></td>
<td>gray</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11.</th>
<th>black</th>
<th>12.</th>
<th>black</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>white</td>
<td></td>
<td>white</td>
</tr>
<tr>
<td></td>
<td>gray</td>
<td></td>
<td>gray</td>
</tr>
</tbody>
</table>

Problem Solving
Write more likely, less likely or equally likely to answer the question.

13. The spinner will __________________ land on white.

14. The spinner will __________________ land on black.