Break the Bank

# Lesson plan

Motivational Set:

* Break the bank from the Facebook and listen to a clip.
* Discuss each vault and its probability of opening.
* Discuss the money and its probability of how much.
* Point out the appropriate probabilities for the game to be “fair” or “win-able”. What would be considered fair?

Development:

* In groups of 3 or more, students will create a Break the Bank
* Choose method of probability (dice, spinner, cards, other, etc)
* Choose the prize sample space.
* Introduce and explain journals.
* Talk about the rubrics

Closure:

* Play the game that is created by each group
* Complete the worksheet assessment

Resources:

* Data Analysis and Probability Games:
	+ <http://resourcebank.ca/courses/data-analysis-and-probability-games/view>
* Break the Bank YouTube:
	+ <https://www.youtube.com/watch?v=O0-CpqrX720>

Break the Bank Student Sheet

# Resources Possible

<http://www.superteachertools.us/spinner/>

<http://www.superteachertools.us/dice/>

# Student Instructions:

1. To make a vault pick a randomizer (ie. dice, spinner, etc.) to determine whether the vault will open or not.
	1. Make a tree diagram to show the sample space.
	2. Explain why you chose this probability.
	3. Write the probability of the vault opening as a fraction.
2. Make 6 vaults in total.
3. You will then pick a prize sample space for each of your vaults, if they are opened. For example:
	1. Vault 1 - $1, $5, $20
	2. Vault 2 – Gum, cookie, Pop, beef jerky
	3. Vault 3 – Pencil, sharpie, loose leaf, crayon

# Probability Table: Break the Bank Sheet

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Vaults | Randomizer | Probability of vault opening | Probability of the winning prize | Sample Space |
| Example: | Spinner | 4/5 | 1/3 | Gum, chocolate, juice. |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |

# Final Game Sheet

|  |  |  |
| --- | --- | --- |
| Vault | Open or closed.  | If open, what was won. |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |

# Journal

1. What do you know about the Break the Bank game? And how do you win? Lose?
2. How do you think each vault is chosen to open or close? How about the money?
3. What do you think the probability of winning break the bank is?
4. What are some different ways you can randomize the vault to open or close? Or amount of money?
5. Should each vault have an equal chance of opening? Or different? Explain.
6. Is it easy to win money in your game? Or difficult? Why do you think this?
7. How many plays would it take to win the “grand prize”?
8. Why did pick a spinner, dice, cards, etc.? Explain.

# Break the Bank Reflection and Assessment

1. Justify each vault and their probabilities. Why did you choose the numbers you did?
2. What did you learn about making the game?
3. Reflect on what difficulties you and your group had in creating the game, how the game is created for C95 or anything you found interesting.
4. Explain how the theoretical vs experimental probability are related. Can you assume they are equal? Why or why not?
5. If you played the game more, what would you think would happen to your experimental probability numbers in relation to the theoretical probability.
6. Represent your theoretical and experimental probability as a percent, fraction and decimal of winning your game.
7. What was the probability of opening Vault 1 AND Vault 2?
8. What was the probability an opening Vault 1 and winning a prize OR opening vault 1 and winning a different prize?
9. What is the theoretical probability of winning your game?
10. Play your own game. Did you end up winning? Did the theoretical probably match the experiments you ran?
11. What does the probability of winning tell us about the Break the Bank game?
12. Who would want to sponsor a game like Break the Bank? Why?

# Rubric:

SP7.3 - I can understand the probability of two independent events (Sample space less than 36) expressed as a fraction, a decimal and a percent.

SP8.2 - I can explain, predict, test and relate the probability of 2 separate events both separately and as they relate to each other concretely, pictorially, orally and symbolically.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 4Exemplary | 3Meeting | 2Approaching | 1Beginning |
| Journal | Meaningful connections to other probability games | Outcome connections are evident in response | Some connections are made, or some are accurate. | Not clear or no connection to outcomes. |
| Reflection and Assessment | Clearly show their understanding of the outcome. Each answer shows detail and thoughtfulness. Your voice is clear in each response. | Responses are correct for each project. Outcome connections are evident in response. | Some responses are correct. There are some outcome connections. | Responses are not correct and has no connections to the outcomes. |
| Tree Diagram | Multiple randomizers and multiple probabilities of winning while keeping the game reasonable.  | Reflects the game your group created. | Not all diagrams are a reflection of the game. | Not evident or no connection to the game your group created. |
| Probability Table | N/A | Reflects the game your group created and complete accurately. | Incomplete. | Not evident or no connection to the game your group created. |
| FASA* Engaged Citizen
* Work Habits
 | Consistently  | Usually | Sometimes | Rarely |