

E.T. Probability (Experimental/Theoretical)

Summary

This activity explains the difference between experimental and theoretical probability.

Main Core Tie

Mathematics Grade 6

[Strand: STATISTICS AND PROBABILITY \(6.SP\) Standard 6.SP.5](#)

Materials

Coin Flip

Coins or two-colored counters

Math journals

- [Pigs in a Pipe](#) (pdf)

- [Pigs in a Pipe](#) (pdf)

Math journals

3 popsicle sticks per group

Crayons

- [The Stick Game](#) (pdf)

- [Secret Rooms](#) (pdf)

- [Family reunion](#) (pdf)

- [The Game Show](#) (pdf)

Additional Resources

Books

- *Everyday Mathematics*

, University of Chicago; ISBN 1-57039-510-1

- *Elementary and Middle School Mathematics*

, by John A. Van De Walle

Background for Teachers

Probability is experimental and theoretical (anticipated). Experimental probability describes the actual event, "Will you absolutely roll a 5 in 6 rolls?" You may or may not, etc. When we are determining the probability of something we are figuring out the theoretical (anticipated) probability. e.g., "I have a 1 in 6 chances of rolling a 5 on a dice. If possible students should have the chance to experiment with probability, then move into the theoretical (anticipated). They need to know and understand the concepts of, experimental and theoretical (anticipated) probability.

Instructional Procedures

Invitation to Learn

With a partner, flip a coin 20 times and make a tally chart of the number of heads and tails. Record this in your math journal or on a piece of paper and be ready to share your findings.

Instructional Procedures

Discuss the results from the Coin Flip activity. (Similarities and differences) Discuss what the chances (head or tail) are for each flip.

Talk about experimental probability (which is what they just did). Discuss what the students think they should have flipped if they flipped 20 times. (10:10) Show on the board the theoretical probability of flipping a coin (tree diagram).

Show the diagram of *Pigs in a Pipe* on the overhead. Explain that there will be 80 balls going into this machine. They will go different directions and we will need to find out how many (of the 80) end up in each dumpster. They will split evenly, with the same amount going down each pipe. Work this through together, students on their paper and you using the overhead. Suggestion for teachers: use 2 different colors of overhead markers on this activity, one color for the fractions and one color for the numbers going into the pipe. The goal is to find out what percent of the balls end up in each of the dumpsters.

Play *The Stick Game*. Pass out three sticks per small group. The students can get the sticks ready for the game by coloring them. Two of the sticks should be red on one side and plain on the other. One stick should be blue on one side and plain on the other. Use the backline for the instructions on coloring the sticks and for playing and scoring the game.

Record then discuss what happens during the game in student's math journals or on a piece of paper.

After the majority have finished, discuss what happened and then as a class write the theoretical (anticipated) probability on the board, the answer. Discuss how the experimental and theoretical can be similar. When doing the tree diagram on the board, use 3 different colors of markers (chalk), one color to represent each stick.

Strategies for Diverse Learners

Advanced learners could be given a tree diagram and have to come up with the situation, numbers and provide the tree showing who or what ended where. e.g., similar to *Secret Rooms*, *Family Reunion*, etc.

ELL and others will work with a partner.

Extensions

<http://www.rainforestmaths.com> Site where students can work together on chance and probability.

Family Connections

Have the students take the worksheet *The Game Show* home to do with their family.

If they have Internet available go to <http://www.rainforestmaths.com/> and then into 6th grade, then into chances and probability.

Assessment Plan

Students will be given another situation, *Secret Rooms*, in which people will be going into a pyramid (You can decide the number of people). Then in their journals they write about the situation, how they figured it out, and draw their tree diagram.

Given a word situation, such as, *Family Reunion*, the students will be able to draw a probability tree diagram to show their answer.

Bibliography

Bright, G.W., Frierson, Jr., D., Tarr, J.E., & Thomas, C. (2003). *Navigating through Probability in Grades 6-8*. Reston: The National Council of Teachers of Mathematics, Inc.

This book addresses many aspects of probability. It mentions that learning how to use, and using tree diagrams helps in understanding probability. Tree diagrams also help build conceptual understanding. Many ideas and ways to teach probability and applications are provided.

James, Alisa, (2005), *Journaling as an Assessment Option*, ERIC Source, November 25, 2006, from <http://www.eric.ed.gov>

This research states that journaling is a tool that can assess student learning in affective and cognitive domains. It allows students a nonthreatening environment to communicate their knowledge.

Authors

[Utah LessonPlans](#)