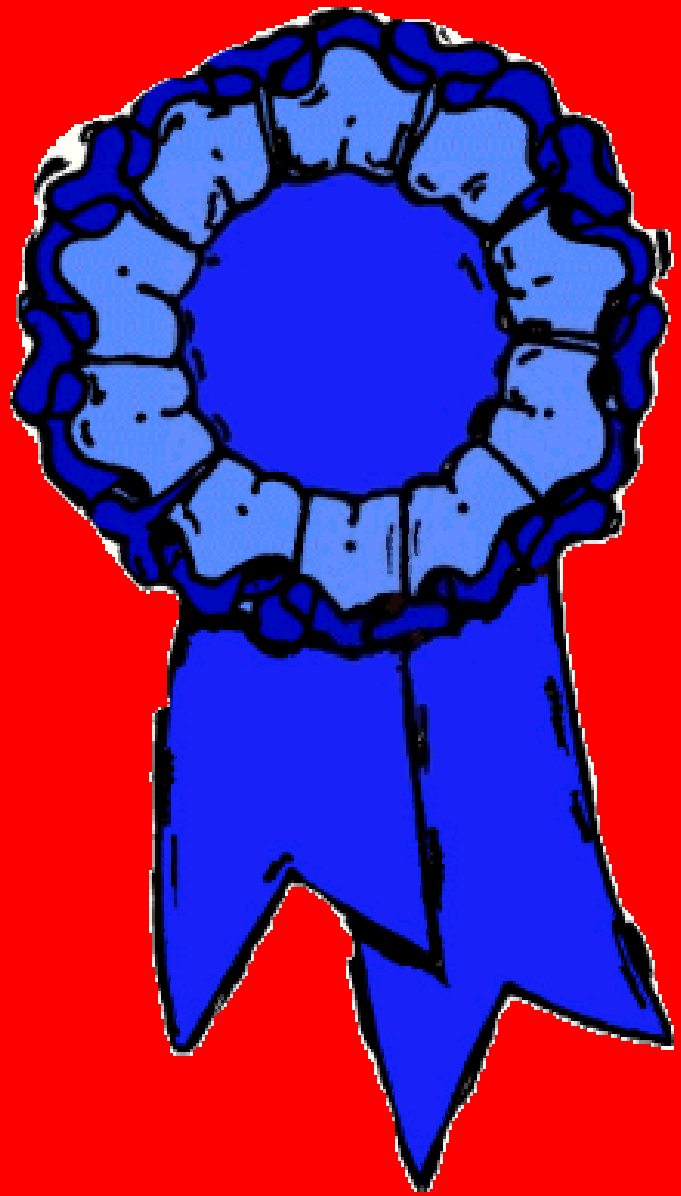
Let's Play

Pick Three Lotto!

OR NOT!!



Blue Ribbon Probability

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Objectives:

Students will discover the difference in the probability of winning versus the probability of losing in a random 3 digit number

Students will create frequency distribution tables to determine difference in experimental probability and theoretical probability.

Students will calculate experimental probability given data.

CSO's

MA.7.2.13 represent and solve real world problems appropriate for 7th grade using multiple strategies

MA.7.5.1 determine experimental and theoretical probability of an event using appropriate technology

MA.7.5.2 construct sample spaces by listing, tree diagrams, and frequency distribution tables to determine permutations and combinations.

Materials

Paper, pen, tootsie rolls,
Work record sheet,
random number generator
or TI-83 or TI-84,
“grand prize”.

Student calculators are optional

Day 1

Procedures:

Administer pre-test

1. Pass out 20 tootsie rolls to each student
2. Ask each student to write down a 3 digit number and put pens down
3. Teacher will use TI-84 to produce 3 digit number
4. Students will record results on record sheet
5. Play one round to make sure all students understand procedure
6. Teacher will collect house winnings or pay out winnings
7. Repeat steps 2-5 – 19 more times
8. Complete record sheet and answer conclusion questions

Day 2

- Construct frequency chart
- Calculate probability for winning and probability for losing using the formula:

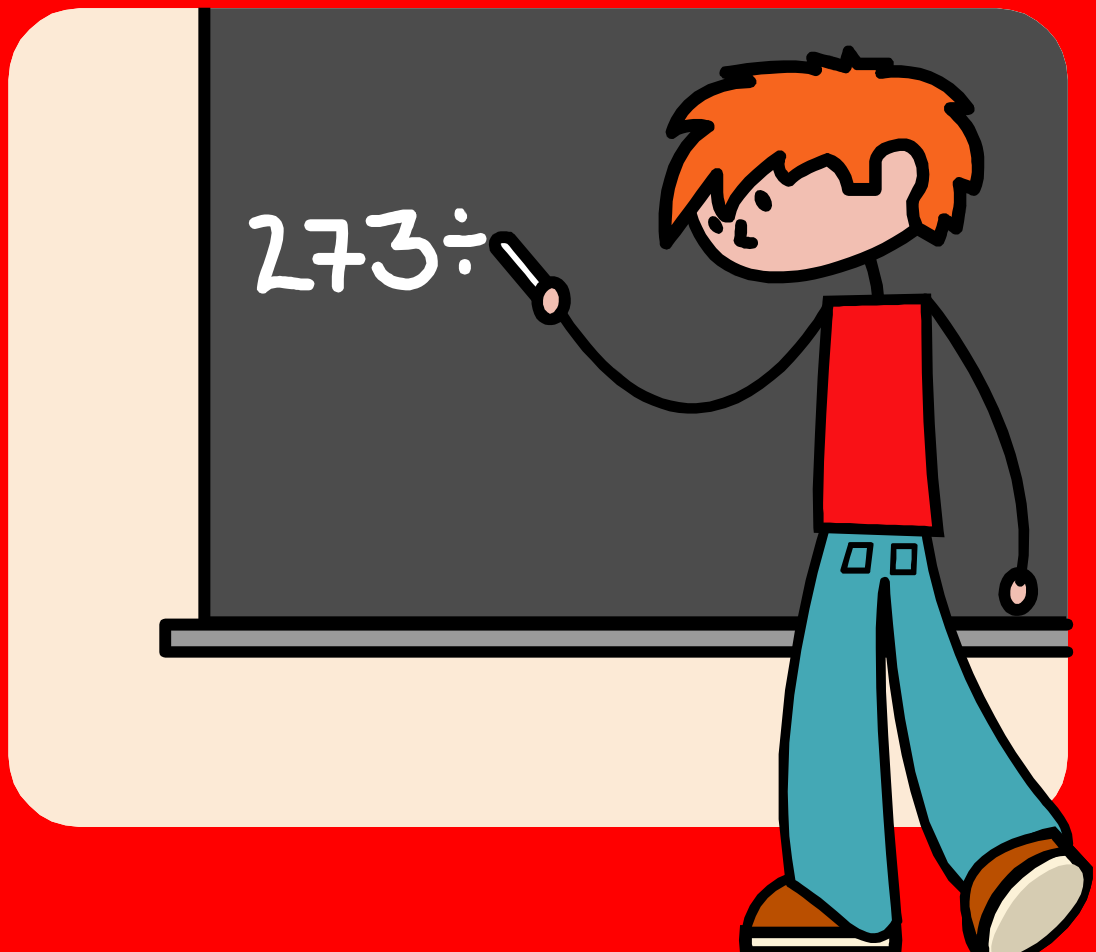
$$\frac{\text{Number of particular response}}{\text{Total number of rounds}}$$

- Teacher will use individual students' frequency charts to calculate class' probabilities
- Teacher will explain difference between experimental and theoretical probabilities
- Share theoretical probability of this particular situation

Theoretical 1/10 * 1/10 * 1/10 = 1/1000 and compare with class experimental results

- Administer post-test

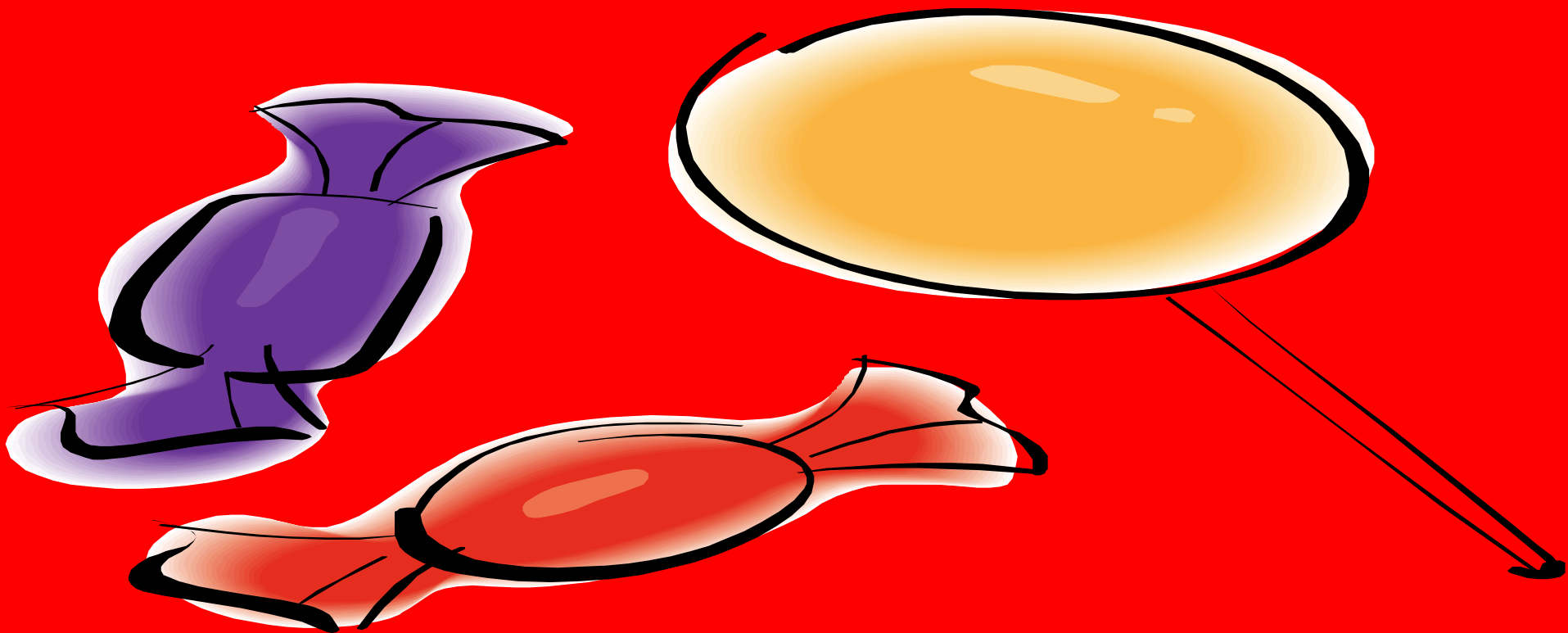
The Pre-test



The mean score is...

25%

Everyone gets Tootsie Rolls



Betting

Tootsie Rolls

The Data sheet

Pick Three – Day 1

Play	Student 3 digit #	Random #	Win or Loss	Total candies

1. How many tootsie rolls did you begin with? _____

2. How many tootsie rolls did you win? _____

3. How many tootsie rolls did you lose? _____

4. If you stopped playing, why? _____

_____

The Video

Answering questions

The Post-test The mean score is...

84%

Performance Descriptors

Novice

1. Student can predict outcome given enough information.
2. Student can collect and organize data.
3. He/she can recognize situations involving probability.
4. Student can not clearly differentiate between theoretical and experimental probability even when given.

Partial Mastery

1. Student can predict outcome given enough information.
2. Student can collect, organize, and graphically represent data displays.
3. Student can identify theoretical and experimental probability when given.

Mastery

1. Student can calculate experimental probability of losing and experimental probability of winning.
2. Student can collect, organize, graphically represent, and interpret data displays.
3. Student can differentiate between theoretical and experimental probability

Above Mastery

1. Student can calculate experimental probability of losing and experimental probability of winning.
2. Student can collect, organize, graphically represent, analyze and interpret data displays.
3. He/she can see a correlation between probabilities of different games of chance but has difficulty determining exact ratios.
4. Student can differentiate between theoretical and experimental probability.

Distinguished

1. Student can calculate experimental probability of losing and experimental probability of winning.
2. Student can collect, organize, graphically represent, analyze and interpret data displays.
3. He/she can extend understanding of probability to decision making to other games of chance and defend decisions using said understanding.
4. Student can differentiate between theoretical and experimental probability.

Assesments

1. Students will be observed as they perform probability experiment a.k.a. Pick 3.
2. Students final work will be assessed for completeness, correct calculations and accuracy of short-answer responses.
3. Students pre-test and post-test will be evaluated for level of mastery.
4. Student frequency table will be evaluated for correct construction and completeness.

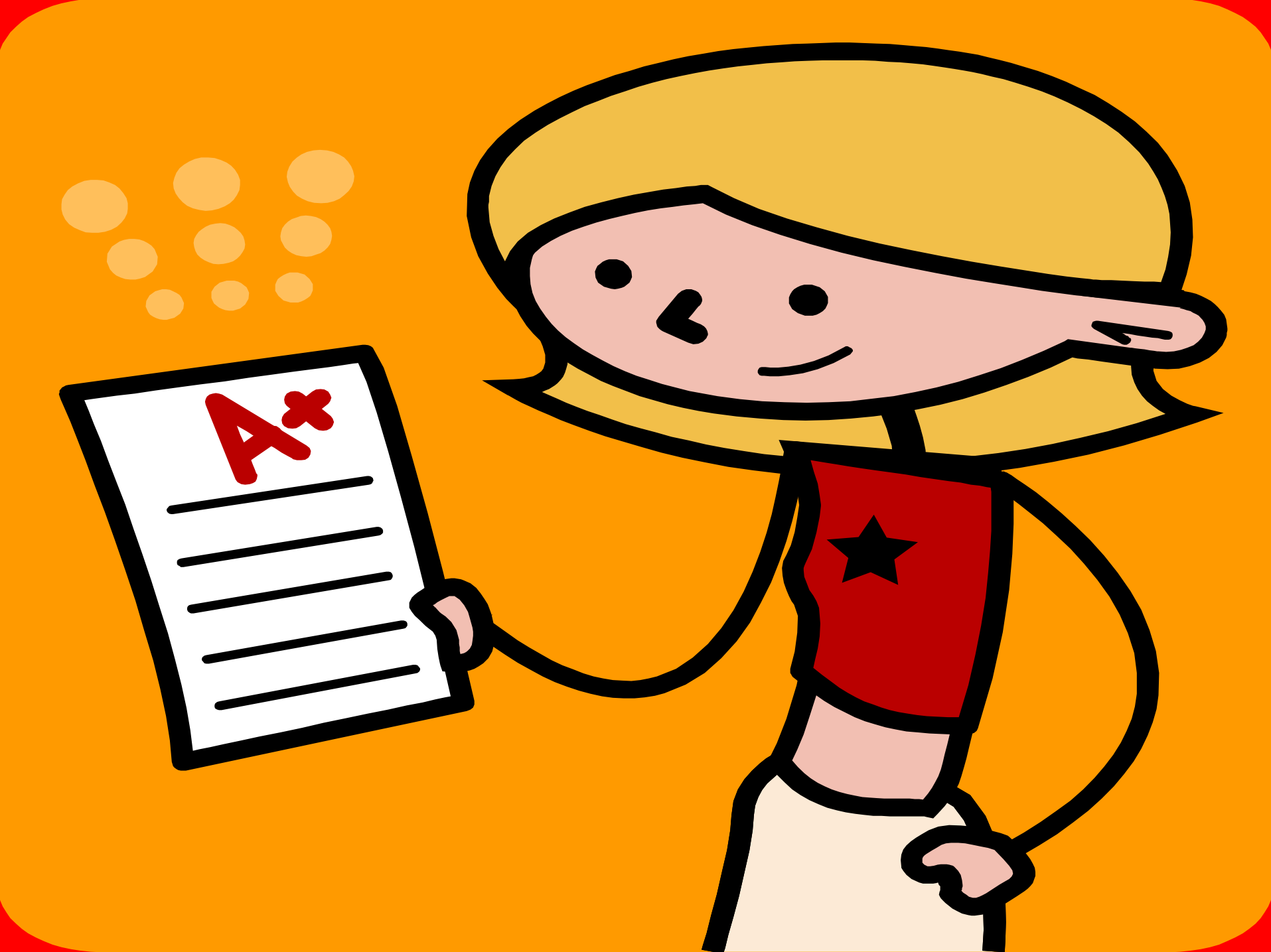
Rubric

Score	3	2	1
Pretest	Completed	Finished but left some questions unanswered	Did not take or left most of the questions unanswered
Part one			
Records	Every round recorded correctly	Left out one or two rounds OR recorded incorrectly	Left out three or more rounds OR recorded three or more incorrectly
Questions	Answered every question completely	Left one answer unanswered	Left two or more questions unanswered
Calculations on candy tally	Complete and accurate	Complete with one mistake	Two or more mistakes
Part two			
Frequency chart	Complete and accurate	Complete with only one mistake	Not complete or with more than one mistake
Individual probability	Accurate	Miscalculation	Did not attempt
Class probability	Accurate	Miscalculation	Did not attempt
Probability for 6 numbers	Accurate	Miscalculation	Did not attempt
Gambling over 18	Answers but justification is not logical	Answers but justification shows little logic	Shows no justification OR did not answer
Difference in probabilities	Indicates thorough understanding	Indicates some understanding but not completely thought through	Indicates no or little understanding OR did not answer question
Grammar on both parts	Used full sentences and only one or two mistakes	Used full sentences and made three or four mistakes	Did not use full sentences OR made more than four mistakes
Post test	Completed	Completed by left some questions unanswered	Did not take or left most questions unanswered
Learning	Shows significant difference in knowledge from pretest to post test	Shows some difference in knowledge from pretest to post test	Shows little difference in knowledge from pretest to post test

Alayna wins

Tootsie Rolls!

Tara beats the odds!


A+

Thank

You

And

Goodnight!