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Probability and Statistics [7th grade]

Courtney Spickelmier
Trinity University

UNDERSTANDING BY DESIGN
Unit Cover Page

Unit Title: Probability and Statistics

Grade Level: 7

Subject/Topic Area(s): Probability and Statistics

Designed by: Courtney Spickelmier

Time Frame: Approximately 4 Weeks

School District: North East Independent School District

School: Jackson Middle School

School Address and Phone:

Jackson Middle School
5438 Vance Jackson
San Antonio, TX 78230
210-442-0550

Brief Summary of Unit (including curricular context and unit goals):

In this 7th grade unit, students will be required to put their mathematical minds to work as they develop an understanding of both theoretical and experimental probabilities and as they learn to analyze and communicate data effectively.

Students will use real life data to explore measures of central tendency and how different measures may lead to different conclusions about the same information. Through the performance assessment, students will collect and analyze data, choosing the best way to communicate their findings. Finally, students will have the opportunity to apply their knowledge of theoretical probability to make predictions and will test those predictions using experimental probability.

Concerning Statistics, the students will understand that there are many was to communicate information, but that some ways are better than others. They will also understand that the way information is presented influences our interpretation of it. Concerning probability, students will understand that for every even there are many possible outcomes, but some outcomes are more likely. They will also understand that the actual outcome of a situation is not always the same as the most likely outcome.

Unit: Probability and Statistics
Grade: 7

Stage 1: Desired Results

Understandings

Students will understand that…

-There are many ways to present information, but depending on the situation, some ways are better than others.
- The way information is presented influences our interpretation of it.
-For every event, there are many possible outcomes, but some outcomes are more likely than others
-The outcome of a situation may not always be the same as your prediction

Essential Questions	Knowledge & Skill
How is what I communicate influenced by how I communicate? Can I say the same thing in more than one way? How probable is "probably"? Can we predict the outcome?	*(NEISD scope & sequence; TEKS; Core; etc.)* Statistics: TEKS 7:11 a- selects and uses an appropriate representation for presenting collected data including line plot, line graph, bar graph, stem and leaf plot, circle graph, and Venn Diagram, and justify the selection TEKS 7:11b- makes inferences and convincing arguments based on an analysis of given or collected data TEKS 7:12a- describe a set of data using mean, median, mode, and range TEKS 7:12b- choose among mean, median, mode, and range to describe a set of data and justifies the choice for a particular situation Probability: TEKS 7:10a- Construct sample spaces for compound events (dependent and independent) TEKS 7:10b- finds the approximate probability of a compound event through experimentation

Stage 2: Assessment Evidence

Performance Task: Data Collection and Communication Project

Our class has teamed up with a group of Math students from Trinity University to exchange information and practice our data collection and communication skills.

Your research group will be responsible for:

- Creating a Survey that will be distributed to Trinity Math Students and Compiling Your Data into Tables
- Communicating the Data Using one or more of the models you have learned about in class

You will be responsible for:

- Making predictions about the responses to your questions. You will write a letter to Miss Spickelmier explaining your predictions and why you made them.
- Writing a second letter to Miss Spickelmier at the end of the project discussing
    - Why you and your group believe that the model you chose to present your data is the most effective and why other models would or would not have worked.
    - What you found when you analyzed your data and what conclusions you and your group made.
    - Whether or not your predictions were correct

(See attached assignment sheets and rubric)

Other evidence:

Test- Unit Exam
Quizzes- Mean, Median, Mode and Range; Probability (Experimental and Theoretical
Academic Prompts: Making a Fair Decisions; Poker Game
Interactive Homework- Heads or Tails
Exit Slips
Daily Class work and Homework

(See attachments)

Stage 3: Learning Activities

(Steps taken to get students to answer Stage 1 questions and complete performance task)
Prior to this unit, students will have completed the Class Data Questionnaire
Note- Prior to this unit the class got three baby finches and had a discussion about the possible combinations of boys and girls.

Day 1: Introductions to Data and Data Representation:

- Each group of students will have an envelope with 6 of the questions and possible responses in them. They will be asked to try to sort the questions into two categories. And give each category a name that describes each group of questions. Hints can be given to help the students look at the types of responses the questions require. They will have no more than 10 minutes for this activity.
- After a brief discussion of the names the students gave to the two types of data, the titles of categorical and numerical data will be given to the two groups of data.
- Once the students are familiar with the terms categorical and numerical data, the class will sort the rest of the questions from the survey as categorical or numerical data.
- Next, explain that both types of data can be represented using bar graphs and line plots.

Show an example of each type of graph and each type of data and discuss the differences in what is on the axis. Both show the frequency of a response vertically, but for categorical data, the possible responses are on the horizontal axis while for numerical data the number is on the horizontal axis.

- Ask students what they notice about the shapes of the graphs showing the same data. The shapes are the same, and the axis are the same, but the graphs are different.
- Finally, show students how to make both of these graphs using the data from the class's response to the question " How many letters are in your first and last name"
- Ask students to work with their partner to make the graph with the question "What color are your eyes?" and "How many siblings do you have?" Set up the axis first as a class then allow the pairs to graph the data.
- If time permits allow students to begin working on the nights **homework**. For the homework students will graph a given set of data and label it as numerical or categorical.
- Students will fill out an **exit slip** before they leave rating their own comfort level with the information.

Day 2: Venn Diagrams and Circle Graphs

- There will be 2 giant Venn Diagrams. One will be labeled "Dogs," "Cat," and "Fish," the other will be labeled "Male," and "Female." There will also be 2 giant tables with the same headings. Each student will have 4 sticky notes and they will be asked to put their names on them.
- As a warm up, students will need to calculate the percentages and fractions using a set of data and the different responses. This is to help set up for the discussion of circle graphs.
- After the warm up, show students how to estimate to make a circle graph using the data from the warm up. At this point, students do not have the geometry knowledge to know how to make the circle graph using central angles or a protractor so they will have to use their knowledge of percentages and fractions to divide up the circle.
- Explain that we are going to practice making circle graphs using the class's information. Students will be asked to take one sticky note and place it in the column that it belongs on the Male/Female Table. While doing this the teacher will pass out the Circle and Venn diagram Notes work worksheet.
- Everyone will create a circle graph together using the classes' male/female ratio.
- Next, ask students to take a second sticky note and put it in Pets chart. This will only work if many students have overlapping pets. If they don't have cat/dog/fish combinations, examine the survey and select a different combination of pets. Brother sister combinations can also be done if pets doesn't work. Call on a few students that you know have just one pet first, then call on some students who have more than one pet. Ask them where they will put their sticky note since they have both.
- Explain that when there is overlapping data we use a different type of model- a Venn Diagram.
- Show how the Venn Diagram works and Have students place their sticky note in the section it belongs on the Venn Diagram.
- Next have the class use sticky notes to make a Venn Diagram of the male female and discuss how nobody is in the overlapping section. The circle graph works better for this set of data.
- Discuss the differences in the data- overlapping and not overlapping. Show several examples of each kind of representation and ask questions about what kids notice. Then let the students begin working on the Circle graph and Venn Diagram Homework.

Day 3: Histogram, Stem and Leaf Plots

- As a warm up students will be shown a bar graph and a histogram and will be asked to find three differences.
- In their interactive notebooks students will paste the axis and 2 sets of data, their class's responses to the question about TV viewing and number of people who live in their house. They will have to determine which set makes a bar graph and which makes a histogram and will have to draw the graphs on the axis. They will be given about 8-10 minutes for this.
- Next the teacher will introduce the stem and leaf chart using ages and weights- made up data
- The teacher will give students a list of all the responses to the question "How many letters are in your first and last name combined?" listed in order from least to greatest. Students will cut the tens column off and past it in a column labeled "stem" in their interactive notebooks and will paste the ones column in the "leaf" column (they will have to group all the numbers with the same tens digit together first.
- If time permits students can begin working on the stem and leaf chart and histogram **homework**

Day 4: Line Graphs, and More Practice Knowing Which to Use

- When students walk in there will be various line graphs hanging throughout the room. As their warm up they will be asked to walk around quietly and make notes of things they notice about the line graphs. Students will be given only 3-5 minutes for this.
- Then the class will have a chalk talk where they can come up and write what they observed on the whiteboard in silence. As guiding questions the teacher can ask them to look at what the graphs have in common.
- After the chalk talk the teacher will hone in on specific things- such as the vertical axis is time. The teacher will explain that line graphs show change over time.
- The teacher will lead a discussion about the different graphs- what do you notice? What trends are there? Etc.
- Next students will have the opportunity to plot a line graph and make observations first in pairs, and then individually.
- Finally the teacher will introduce the homework by reviewing all the different types of graphs the students have learned about. Ask the students when they will use each graph and pass out the Data Communication Chart for them to fill out.
- If time permits students can begin working on their **homework** which covers all the types of graphs they have learned
- Students will fill out an **exit slip** rating their own comfort level with the information.

Comment [s1]: Need to find good examples of line graphs with real data online

Comment [s2]: Homework asking them to interpret and create different types of graphs

Day 5: Buffer Day

- A discussion of the essential questions "Can I say the same thing in more than one way" should close out this portion of the unit. This is a day designed for tying up loose ends.

Day 6: Mean, Median , Mode and Range- The basics

- Warm up: Have kids think about and brainstorm on the questions, "How is it possible that all the different news stations in San Antonio can say that they are number 1?" and "What do you think of when you hear the word *average*?"
- Explain that an average is a measure of what is typical and while they are used to the word being used to describe their grade, there are actually 3 types of averages. We call these three "Measures of Central Tendency" Mean, Median, and Mode.

Comment [cs3]: Need to make a warm up for this

- Explain that when looking at sets of data, it is a good idea to put the numbers in order from least to greatest. This makes it easier for us to see trends in the data, to see what is typical and to see what our range is.
- Explain range and how to find it
- Students will use their interactive notebooks to work with the three measures of central tendency and range. First explain each measure then have them enter them into their notebooks.
    - Mean: Students will be given a bar graph on paper and paper squares. They will have the same number of squares as units in the bar graph. They will then take the squares and create the bar graph. Then they will move the squares around so that all the columns in the graph are even
    - Median: Using the same set of data, students will write the data out in the median strips and fold the median strips in half
    - Mode: Students will color each different number different colors and the same number the same colors. The color that appears most often is the mode.
    - Next students will identify the range of the data.
    - Students will work several problems in their notebooks as practice
- After students have finished remind the students that we use measures of central tendency to describe what is typical and sometimes one measure is better than another. Show several sets of data with the mean, median, and mode already calculated and ask kids what they think is the best measure.
- Then explain that if the data is generally close together, the mean is best. If it is a bit spread out, the median is best, and if it repeats itself frequently the mode is best. (Also note that there is sometimes more than one mode)
- Explain that when choosing a measure of central tendency, the most important thing is to justify ones reasoning.
- **Exit Slip: Looking at my Grades-** Give students their list of daily grades for the unit and ask them to identify the mean, median, and mode. Then ask "If you could pick which measure of central tendency your teacher used to calculate your grade, which would you pick?" ask "Which would be the most accurate measure?"
- Before class ends have kids answer the questions to the warm up, "How can all the different news stations in San Antonio say they are number one?"
- If time permits, students can work on their homework: Mean, Median, Mode, and Range: The Basics

Comment [cs4]: Notebook stuff for this lesson

Comment [N5]: worksheet

Day 7: Mean, Median , Mode and Range: digging deeper

- Warm up: Students will calculate the mean median mode, and range of a set of data and explain which the best measure of central tendency is, justifying their answer.
- Introduce the days lesson: We will be digging a little bit deeper into mean, median, mode, and range and talking about how to find missing data.
- First address missing data with mean and range- if we know what the range is, but are missing one or more pieces of data we can sometimes figure it out using our problem solving strategies like thinking backwards or drawing a picture.
- We can also think backwards when we are trying to find missing data with mean.
- First talk about what we do going forward- add all the numbers and divide by the number of numbers. So if we know the average but don't know the entire sum we can multiply and subtract- we do the opposite.
- Next discuss how adding pieces of data to data sets changes mean, median, mode and range. Discuss how we can goal set if we want a particular mean, median, mode or range.

Comment [N6]: create warm up

- Have kids work in pairs on class work problems, then individually on homework if time permits.
- Before leaving students will look at their test grades and complete the **Exit Slip: Thinking about your Tests Grades**

Day 8 and 9: Buffer Day

- These are optional day that the teacher can take if more time is needed to cover mean, median, mode, and range
- If students grasp the concepts, they can work in pairs or in groups of four during class on the Exemplars problem **"Making a Fair Decision"**
- If class time is needed to further explore these concepts, the problem can be given as homework
- Prior to the beginning of the performance assessment a class discussion of the question "How what I say is influenced by how I communicate?" would be useful.

Days 10-13: Performance Assessment: **Data Collection and Communication**

Note: ideally this assessment would occur after the data communication portion of this unit, but due to availability of the computer lab, it must fall a week late in the unit.

First Day of Performance Assessment

- Before beginning the performance assessment students will take a **Quiz over Mean, Median, Mode, and Range**
- After the students take the quiz they will grade their own quiz and will have the opportunity to ask questions.
- Next the teacher will explain the performance assessment. Each student will get a folder with their checklist stapled inside. All or their individual work will go in that folder. Each group will also have a hanging folder that their individual folders and group work will go into. The teacher will go through and explain each part of the assignment and each rubric.
- A quick review of the different types of graphs and charts will also be helpful.
- Finally students will get into their groups and each student will chooses a question that they want to include on the survey. Each student must pick a different question. The group will write up their survey with all the questions and each student will write up the question he or she picked to put in the student folder.

Second Day of Performance Assessment

- Between day one and day two the teacher will have created the surveys for each group and will have 15 responses for each survey (this is just a matter of copy and paste)
- The first letter explaining the questions and the students' predictions will be due on this day.
- Each student will receive a set of the survey's with the responses and they will create a chart in Microsoft excel for the question they chose. The charts they create will be used by the whole group in creating graphs to communicate the data

Comment [s7]: Need to make up survey responses

Third and Fourth Days of Performance Assessment

- Students will have day three and four to create their graphs and work on their final letter.
- At the end of day 4 students will fill out the group assessments.

Everything is Due at the Beginning of Class on Day 5

Day 14: Buffer Day

- An extra day may be needed to complete the performance assessment or to tie up loose ends. If an extra day is not needed, the class can move on to the probability portion of the

unit on this day.

Day 15: Sample Spaces-

- Warm Up- Finding missing data- students will practice finding missing data given the average.
- Introducing sample spaces- Ask students if they can remember what we talked about the first day that the finches joined our classroom. Some will likely recall that we discussed the possibilities of the birds being male or female- ask them to recall what types of possibilities we found.
  - First we found that Lucky could be a boy or a girl, that Speedy could be a boy or a girl, and that Shananay could be a boy or a girl.
  - Then we made a table with all the different possibilities
  - Then we talked about the different combinations
- Then explain that what we did, was we created a sample space. A sample space shows all the possible outcomes—add outcome and sample space to the word wall.
- There are several ways to represent a sample space- make a table, make a tree diagram, and make a list.
- Show kids how to do all three emphasizing the importance of organization
- Do several problems in front of the class using all three models and having the problems get increasingly harder. Start with independent things- like the possible outcomes of flipping a coin, rolling 1 dice or spinning a spinner, then move one to dependent and compound events like possible outcomes on rolling 2 die and possible ways to get a sum of 4 when rolling 2 dice.
- Next give some problems for students to solve in pairs using all the methods.
- Finally ask them what they notice about the number of possibilities in each event and the number of possibilities of the compound events. (You multiply the possibilities together)
- Show them why this is true using the charts
- As guided practice, have kids work in pairs finding all the possible appetizer, entrée, dessert combinations using a menu. They must show the possibilities in all three forms to practice using all three. They must also multiply the outcomes for each area together to find out the total number of possible outcomes so that they can check their work.
- Students will fill out an **exit slip** rating their understanding of the topic before leaving.
- Homework: **Card Game-** for homework kids will complete the exemplars problem "Card Game." If time permits they can begin in class. Before kids leave discuss what they will need to do to solve the problem as a class.

Comment [cs8]: Need to get copies of take out menus from Taipei or another place

Day 16: Theoretical Probability

- Warm Up-TAKS problem on sample space
- As a hook- ask kids what they usually think when they hear the word "probably."
- Tell kids that in math we have a way to find out and represent just how probable something is.- If we know that something is random, and we know what the possible outcomes are, we can calculate the probability.
- Put a picture of a spinner with 4 colors equally distributed on the overhead and ask kids what the possible outcomes would be for spinning the spinner.
- Number off the different colors and discuss the fact that since the colors are equally distributed the probability of the spinner landing on each of the colors is the same.
- Find the probability of each color then ask kids what they notice when they add up the numbers- it equals one

Comment [cs9]: Need to make overheads of spinners

- Explain that we present probabilities as fractions, decimals, and percents, and the probability represents how sure we can be that an outcome will happen- just how probable an outcome is. – When we add them up it equals one or 100% because we can be 100% sure that there will be an outcome.
- Show another spinner with 5 colors evenly distributed and ask what the probability is of the spinner landing on a color.
- Next show a spinner without the pieces evenly distributed and asks what they think the probability of landing on the bigger color is.
- Explain that the spinner is still divided into 5 pieces, but now 2 of those pieces are the same color so it is more probable that the spinner will land on that piece.
- Work several more examples with the students explaining that first they need to find out what the possibilities are and make sure that each possibility is equally as likely -like the spinner that is evenly distributed.
- Tie all this back to the birds and ask students what the probability of each combination is. Have them add up all the probabilities.
- Finally give them some probabilities and have them find the probability of all other outcomes by subtracting from one.
- As guided practice, have kids work on a worksheet using the rally coach structure
- If time permits students can begin working on the nights homework

Day 17: Compound Probability

- The warm up will review how to add and multiply fractions and decimals, a skill that is necessary in determining probabilities of compound events.

Comment [cs10]: Need to make warn up

- Modified Concept Attainment: What is the rule? Explain how the game works and do a practice round with the rule "add 2." The teacher will say:
  - If I start with the number 1, I will end with the number 3
  - If I start with the number 2, I will end with the number 4
  - Id I start with the number 3, I will end with the number 5
  - Next the kids will give some examples. And when everyone seems to have it the teacher will ask "What's the rule, or what did I do"
- For the Compound probability Rule the teacher will write everything on the overhead as the class looks at each example:
  - If I the probability of one thing happening is ½, and the probability of another think happening is ½, then the probability of both things happening together is ¼ .
  - If I the probability of one thing happening is ½, and the probability of another think happening is 1/3 , then the probability of both things happening together is 1/6.
  - If the probability of one thing happening is 2/3 and the probability of another thing happening is ½, then the probability of both things happening is 2/6 which is the same as 1/3
  - Give several examples like this until kids start looking like they have it. Then ask the kids to give some examples without giving the rule. When is seems that everyone has it, ask the rule: you multiply them together.
- Explain that sometimes we need to know the probability of *compound events* – add this to the word wall. We can make sample spaces, but this may take too long.
- Ask kids what they did to find out how many possibilities there were in compound event.- they multiplied.
- Explain that to find the probability of compound events, we multiply our probabilities together.- the bottom shows the possible outcomes and the top shows how often what we

want will occur.

- Give some examples emphasizing the word "and," and have the kids find the compound probabilities
- Next give an example if dependent events and ask the kids what they think they should do when they hear the work or.
- Work a few examples with the kids emphasizing that the word that makes the difference is and vs. or.
- After working problems as a class, allow kids to work problems together using the rally coach cooperative learning structure.
- Students will fill out an **exit slip** rating their own understanding
- If time permits students can begin working on their homework in class

Comment [cs11]: Need to make some good examples

Comment [cs12]: Need a rally coach worksheet

Comment [cs13]: Homework on multiplying and adding probabilities

Day 18: Probability Raffle

- Warm up- Why doesn't your math teacher ever play the lottery?
- Students will receive 5 tickets and will make decisions about how to enter their tickets into a drawing for 5 prizes. When students enter to win the prizes, they must sign their name and the number of tickets they put into each box on a sign up list.
- After everyone has entered the drawings, the sign up lists will be posted and students will fill out the probability raffle worksheet using the information from the lists.
- After the class finishes with the probability raffle worksheet, discuss the classes predictions about who will win each raffle and explain that we can use probability to make predictions about outcomes.
- Then we will draw a name from each box and discuss whether or not our predictions were correct. We will discuss the fact that just because their predictions were not correct doesn't mean they were bad predictions because they were mathematically sound.

Comment [cs14]: Make a transparency for this

Comment [s15]: Need to make a worksheet for this

Day 19: Experimental Probability

- Warm Up: TAKS question on theoretical probability
- Students will complete a lab and will rotate through lab stations testing probabilities. Prior to completing each experiment, the class will make predictions about the outcomes based on theoretical probability. Lab stations include:
    - Students will spin a spinner that has unequal color distribution (7 sections with 2 of the sections being blue, 2 being red, 1being purple, and 3 being green.) They will find the experimental probability of the spinner landing on each color
    - Students will flip 3 colored manipulative chips (red on one side and yellow on the other) and find the experimental probability of all three landing on the same color.
    - Students will spin a spinner numbered 1-4, and roll a 6 sided dice, and determine the probability of ending up with numbers whose sum is 6.
- There should be 3 of each station and students should have 7 minutes to complete each experiment. They will have a lab sheet with places to put their data and questions to answer. They will be instructed to first enter all their data and then to address the questions. If they do not finish the questions in class they will need to finish them for homework.
- The students' homework will be the **interactive homework** which will be due the day of the review for the exam.

Comment [s16]: Need to find 1 or 2 TAKS questions to use as a warm up

Comment [s17]: Need to make lab sheet

Day 20: Buffer Day

- It is likely that the teacher will need another day to review probability concepts with students so this day is built in to provide an extra day in case more time is needed.
- At the end of this day the **Probability Quiz** will be given and graded in class so that students can ask questions. Students will also be given a review for the unit exam

Comment [s18]: Make a review for the exam based on test questions

Day 21: Review For Exam

- Before the review, the teacher will ask for student's results on the interactive homework. The students results will be added together to make a class's results. There will be a brief discussion as to why the class's results are more accurate than the individual results- because the more trials the more accurate your results.
- Students will play numbered heads in their cooperative learning group. The questions used will be the questions from the review the night before. The winning team will get 5 points extra credit on the exam. Students will work the questions on white boards
- At the end of the class period the teacher will work through any questions that were not addressed during the game and ask for questions.

Day 22: Unit Exam

Comment [s19]: Need to make exam

Data Collection and Communication

Our class has teamed up with a group of Math students from Trinity University to exchange information and practice our data collection and communication skills.

Your research group will be responsible for:

- Creating a Survey that will be distributed to Trinity Math Students Compiling Your Data into Tables
- Communicating the Data Using one or more of the models you have learned about in class

Comment [s20]: Apply

You will be responsible for:

- Making predictions about the responses to your questions. You will write a letter to Miss Spickelmier explaining your predictions and why you made them.

Comment [s21]: Explain

- Writing a second letter to Miss Spickelmier at the end of the project discussing
    - Why you and your group believe that the model you chose to present your data is the most effective and why other models would or would not have worked.

Comment [s22]: Explain

    - What you found when you analyzed your data and what conclusions you and your group made.
    - Whether or not your predictions were correct

Comment [s23]: Interpret

Time Frame:

Day 1:Friday: Create Your Survey

Each person will select a different question from the list of possible questions. If you want to ask a question that is not on the list, it must be OKed by Miss Spickelmier. After you have created your survey you can begin to discuss predictions and begin writing your first letter to Miss Spickelmier. Your predictions letter will be due at the beginning of your next class.

Day 2: Monday: Compile Data into Tables in the Computer Lab

*Predictions Letter Due

Each person in the group will take one of the questions and create a table using Microsoft Excel.

Day 3: Tuesday: Communicate the Data

You and your group will analyze and communicate the data using one of the models you have learned about. You may choose to communicate your data using one model for each question or you may choose to communicate all your data in one graph or chart.

Day 4: Wednesday: Communicate the Data Work Day

Continue Working on your communication of data and begin writing your second letter to Miss Spickelmier. Your Final Project will be Due to Miss Spickelmier Thursday.

Data Collection and Communication Project

Our class has teamed up with a group of Math students from Trinity University to exchange information and practice our data collection and communication skills.

Friday: Create the Survey

_____ I have selected one question to put on the survey that my group is making.

Friday's Homework: (due Monday)

_____I have written a letter to Miss Spickelmier explaining what questions my group is asking, what predictions I made about the possible responses to my survey, and why I made those predictions?

Monday:

_____ I have created a Microsoft excel table showing all the responses to the question I chose for the survey?

Tuesday:

_____ My group and I examined all our data and decided on a way to communicate the data? Is it the most effective way?

Tuesday and Wednesday:

_____ Has my group and I created a model to communicate the data? Is it neat, accurate, and easy to read?

Tuesday and Wednesday's homework:

_____ Have I written a letter to Miss Spickelmier explaining why the model my group chose was the best way to communicate the data, what conclusions I can draw from the data, and whether or not my predictions were correct?

All parts of the project are due Thursday at the beginning of class!

Data Communication Rubric

Rookie Veteran Starter All Star

	Appropriateness	Accuracy	Readability	Participation
4--- Expert	I chose the best way to communicate all of my data	My graphs are drawn correctly. Everything is labeled	My graphs are easy to read. They are neat, organized and it is easy for others to understand my data.	I participated in all parts of the group project and worked well with my group members
3--- Practitioner	I chose an appropriate way to communicate my data, but there may be a better way.	My graphs are drawn correctly, but I have not labeled everything.	My graphs are organized and easy to read, but they aren't very neat.	I participated in most of the group project, but could have done more to help my group
2--- Apprentice	Most of my data is communicated in an appropriate way, but some is not	My graphs may have some minor mistakes and I forgot to label some important things.	My graphs are slightly disorganized and messy, but they are still pretty easy to read	I only helped a little bit with only some of the project.
1--- Novice	I did not choose an appropriate way to communicate most of my data	My graphs have some major mistakes and I did not label them.	My graphs are not easy to read.	I did not help my group complete the group portion of my assignment.

Group Assessment

Group Number _____ Your Name: _____

Please rate yourself and your group members from 1-4 in each area. 1 being the lowest score and 4 being the best.

Group Member Names:	This person worked well wirh the other group members	This person did their part! They chose a question for the survey and created a table	This person helped the group finish the final graphs and charts.	Helped team mates who needed help or asked for and was open to help from Team Mates	Grade you would give each person

Comments:

Group Assessment

Group Number _____ Your Name: _____

Please rate yourself and your group members from 1-4 in each area. 1 being the lowest score and 4 being the best.

Group Member Names:	This person worked well wirh the other group members	This person did their part! They chose a question for the survey and created a table	This person helped the group finish the final graphs and charts.	Helped team mates who needed help or asked for and was open to help from Team Mates	Grade you would give each person

Comments:

Name: _____ Group #: _____

Data Communication Grade Sheet

Appropriateness (40%):	**1**	**2**	**3**	**4**	Comments:
Accuracy (30%):	**1**	**2**	**3**	**4**	
Readability (20%):	**1**	**2**	**3**	**4**	
Participation (10%):	**1**	**2**	**3**	**4**	

Total Score:

Name: _____ Group #: _____

Data Communication Grade Sheet

Appropriateness (40%):	**1**	**2**	**3**	**4**	Comments:
Accuracy (30%):	**1**	**2**	**3**	**4**	
Readability (20%):	**1**	**2**	**3**	**4**	
Participation (10%):	**1**	**2**	**3**	**4**	

Total Score:

First Letter

Rookie Veteran Starter All Star

	Questions	Predictions	Reasoning
4--- Expert	I discussed all of the questions that my group and I selected for our survey	I made predictions about the responses to each of the questions on our survey	I explained why I made the predictions I made.
3--- Practitioner	I discussed most of the questions that my group and I selected for our survey	I made predictions about the possible responses to most of the questions on our survey	I explained why I made most of my predictions
2--- Apprentice	I discussed some of the questions that my group and I selected for our survey	made predictions about some of the questions on our survey	I explained why I made some of my predictions
1--- Novice	I did not discuss the questions that my group and I selected for our survey	I did not make predictions about the responses the questions on our survey	I did not explain why I made my predictions

Comments:

Questions: **1** **2** **3** **4**

Predictions **1** **2** **3** **4**

Reasoning: **1** **2** **3** **4**

Total Score:

Second Letter

Rookie Veteran Starter All Star

	Model	Conclusions	Predictions
4--- Expert	I explained why my group chose the models they chose and why other models would or wouldn't work.	I analyzed the data and drew reasonable conclusions	I explained why each of my predictions were correct or incorrect and discussed why I thought I was right or wrong.
3--- Practitioner	I explained why my group chose the models they chose but did not discuss other possibilities.	I drew conclusions from the data, but there were some holes in my reasons	I explained why most of my predictions were correct or incorrect and discussed why I thought I was right or wrong
2--- Apprentice	I explained why my group chose some of the models we chose.	I drew conclusions, but they were not reasonable	I said if my corrections were right or wrong but did not think about why.
1--- Novice	I did not discuss the models my group chose.	I did try to draw any conclusions	I did not talk about my predictions and whether they were right or wrong.

Comments:

Questions: **1** **2** **3** **4**

Predictions **1** **2** **3** **4**

Reasoning: **1** **2** **3** **4**

Total Score:

Bank of Questions:

Do you enjoy living in the dorms?

___I love it! ___It is OK ___I like it sometimes

___I don't particularly like it ___ I hate it!

What happens when you get in trouble in class?

About how much time do you spend on homework each night per class?

Were you always good at School?

How much does college cost you?

How many classes are you taking?

1 2 3 4 5 6 7

Do you work and go to school at the same time?

Yes No

How many classes are in the morning, the afternoon, and the evening

Morning: ____ Afternoon:____ Evening: _____

What happens if you don't go to class?

Making a Fair Decision

You are a part of a reading club at the school library. The librarian lets you choose your own teams. Each team had to read as many books as they could in a month. The team that worked the hardest gets the chance to go to the town bookstore and pick out a book for free.

The librarian has a problem. She noticed that the teams have different number of members. This is going to make it hard to decide which team worked the hardest.

The Librarian wants it to be fair, so she asked you to be the judge. You have to come up with a mathematically fair way to pick the hardest working team. Please write a letter explaining exactly why you picked a certain team and why you think it is a fair decision.

Comment [cs24]: Interpret

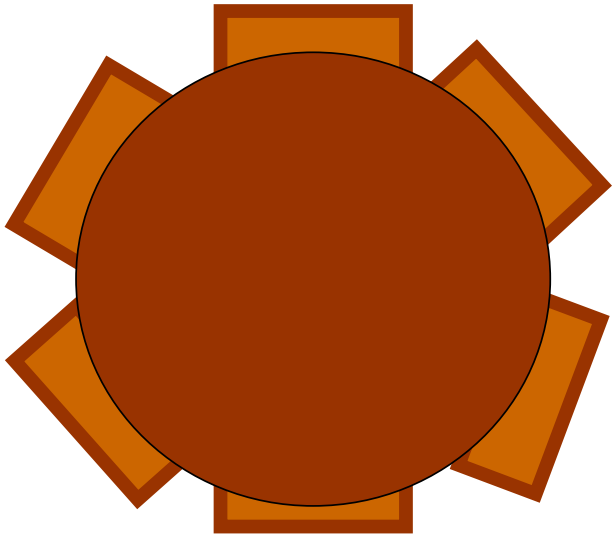
Comment [cs25]: Explain

Team 1		Team 2		Team 3	
Name	Books	Name	Books	Name	Books
John	5	Alicia	4	Peter	4
Claire	5	David	4	Wendy	3
Beth	2	Cindy	6	Mary	4
CiCi	4			Terri	3
Jeanne	3				

Comment [cs26]: Apply

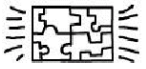
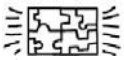
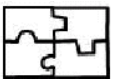
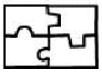
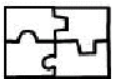
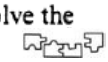
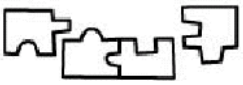
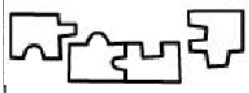
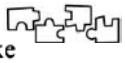
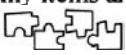
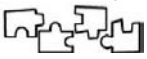
Card Game

Every week 5 friends met for a card game. They used a table with 6 chairs. Eventually, they realized that they had chosen a different seating arrangement each week and had exhausted every possibility. How long had the friends played together?



Exemplars Mathematics Rubric

Rookie Veteran Starter All Star

	Understanding	Reasoning	Accuracy	Communication
Expert 4	• I can show a deep understanding of the problem. • I completely address all parts of the task. • I got it! I can use big math ideas to solve the problem 	• I can use powerful and thorough strategies to get to effective solutions. • I can explore, analyze, and justify all my claims. • I can observe and make connections beyond the problem to real-life situations. 	• My procedures are organized so others can follow it. • All of my work is correct. • I can label every item. 	• I clearly explain how I solved the problem. • I use visual designs to show how my ideas match the solution. • I can use math language to explain my thinking. 
Practitioner 3	• I have a thorough understanding of the problem. • I address the important parts the task. • I logically use big math ideas to solve the problem. 	• I use effective strategies for the solutions. • I give evidence for my claims. • I can observe and make connections. 	• My procedures are organized and can be followed by others. • If I made mistakes, they are not important ones. • I can label most of the items. 	• I explain how I solved the problem. • I use visual designs to show my ideas. • I can use some math language. 
Apprentice 2	• I show a limited understanding of the problem. • I address some of the important parts of the task. • My big math ideas did not work very well to solve the problem. 	• My strategies worked for part of the problem. • I did not give clear evidence for my claims. • I tried to observe and make connections. 	• My procedures are difficult for others to follow. • I have many mistakes in my work. • Some of my items are labeled. 	• I did not explain how the problem was solved very well. • My visual designs do not match the solution. • I can use a little math language. 
Novice 1	• I did not show that I understand the problem. • I did not address the important parts of the task. • My solution does not use big math ideas.	• I did not use a strategy that helps solve the problem. • The evidence for my claims does not make sense.  • I did not make connections to the problem.	• My procedures are not organized for others to follow. • There are too many big mistakes in my work. • None of my items are labeled. 	• I did not explain how my solution works to solve the problem. • I did not create designs to help explain the solution. • I did not use math language 

Student: _____ Class Period: _____

Exemplar's Grading Rubric

	Novice (0-16pts)	Apprentice (17-19pts)	Practitioner (20-22pts)	Expert (23-25pts)	Comments
Understanding					
Reasoning					
Accuracy					
Communication					

Total Score:_____

Grade Given by Classmates: _____

Student: _____ Class Period: _____

Exemplar's Grading Rubric

	Novice (0-16pts)	Apprentice (17-19pts)	Practitioner (20-22pts)	Expert (23-25pts)	Comments
Understanding					
Reasoning					
Accuracy					
Communication					

Total Score:_____

Name: _____ Period:_____ Date: _____

How do you feel about today's lesson?

1	2	3	4	5
(I don't have it yet)				(I get it!)

Comments:

Name: _____ Period:_____ Date: _____

How do you feel about today's lesson?

1	2	3	4	5
(I don't have it yet)				(I get it!)

Comments:

Name: _____ Period:_____ Date: _____

How do you feel about today's lesson?

1	2	3	4	5
(I don't have it yet)				(I get it!)

Comments:

Looking at My Grades

Examine your grades and answer the questions bellow. Pretend that your grades are not weighted.

Comment [cs27]: Apply

What is the range of your grades? _____

What is your mean grade? _____

What is your median grade? _____

What is your mode grade? _____

Which measure do you think is the most accurate measure of what is typical? Why?

Comment [cs28]: Interpret

Comment [cs29]: Explain

_____

_____

_____

_____

If you could choose which measure Miss Spickelmier used to calculate your average for your report card, which would you choose and why?

_____

_____

_____

_____

Thinking about your Test Grades

Look at your test grades. Your tests grades makes up half of your entire grade for the class, so the grades you make on your tests are very important.

Comment [cs30]: Apply

What grade will you have to make on your Unit Exam so that your Exam Average is an A? _____

What grade will you have to make on your Unit Exam so that your Exam Average is a B? _____

What grade will you have to make on your Unit Exam so that your Exam Average is a C? _____

Students Name: _____ Period: _____ Date:_____

Heads or Tails

Dear Family Partner:
In math, we have been studying theoretical and experimental probability. I hope you enjoy this activity with me. This assignment is due _____.

Sincerely,

_____
(Student Signature)

Objective: To calculate the experimental probability of a coin landing on heads and on tails

Who is your Family Partner?
Name: _____ Relationship: _____

LOOK THIS OVER: Explain these vocabulary words to your family partner

Probability: The chance that a specific outcome will occur.

Theoretical Probability: A mathematical prediction of how probable it is that a specific outcome will occur.

- Theoretical Probability is written as the fraction: $\frac{\text{Specific Outcome}}{\text{Total \# of Outcomes}}$

For example:
The theoretical probability of rolling a 5 on a 6 sided dice is 1/6 because there are 6 possible outcomes (Total # of outcomes) and the 5 appears on the dice only 1 time (Specific Outcome)

Experimental Probability: How probable and outcome is based on the frequency of the outcome in an experiment.

- Theoretical Probability is written as the fraction: $\frac{\text{\# times outcome occurred}}{\text{\# of Trials}}$

For example:
If I rolled a dice 10 times and rolled a 5 twice, the experimental probability of rolling a 5 is 2/10 or 1/5 because I rolled the dice a total of 10 times (#of trials) and I rolled the 5 two times (# times outcome occurred).

NOW TRY THIS: Answer the Questions and Complete the Experiment together

1. What is the theoretical probability of the coin landing on heads? _____
2. What is the theoretical probability of the coin landing on tails? _____
3. If you flip the coin 50 times, how many times do you expect it to land on heads? _____
4. If you flip the coin 50 times, how many times do you expect it to land on tails? _____

Now take turns flipping the coin. Each person should flip the coin 25 times and make a tally in the appropriate section of the frequency table below

	Family Partner	Student
Heads		
Tails		

times out of the 25 flips that the family partner's coin landed on heads: _____

- What is the Experimental probability of the coin landing on heads based only on these 25 trials? _____

times out of the 25 flips that the family partner's coin landed on tails: _____

- What is the Experimental probability of the coin landing on tails based only on these 25 trials?_____

times out of the 25 flips that the student's coin landed on heads: _____

- What is the Experimental probability of the coin landing on heads based only on these 25 trials? _____

times out of the 25 flips that the student's coin landed on tails: _____

- What is the Experimental probability of the coin landing on tails based only on these 25 trials? _____

Total # times out of all 50 trials that the coin landed on heads: _____

- What is the Experimental probability of the coin landing on heads based on all 50 of the flips? _____

Total # times out of the 50 trials that the coin landed on tails:

- What is the Experimental probability of the coin landing on tails based on all 50 of the flips? _____

What do you notice when you compare the theoretical probabilities and your expectations with each of the experimental probabilities you calculated?

HOME TO SCHOOL COMMUNICATION:

Dear Family Partner,

Thank you for working on this activity with your child. Please give me your reactions to your child's work on this activity. Write YES or NO for each statement.

1. My child understood the homework and was able to discuss it.
2. My Child and I enjoyed the activity.
3. The assignment helped me know what my child is learning in math.

Other Comments:

_____

_____

_____

Family Partner Signature: _____

Probability Quiz

Comment [N31]: Apply

1. Kelsey had 2 dimes, 1 quarter, and 1 nickel in her hand. She accidentally dropped 2 coins. Which list shows all the possible unique combinations of 2 coins that she could have dropped?

A. Dime/Dime, Quarter/Dime, Dime/Nickel, Nickel/Quarter
B. Dime/Dime, Dime/Quarter, Dime/Nickel, Quarter/Dime, Quarter/Nickel, Nickel/Quarter
C. Dime/Quarter, Dime/Nickel, Nickel/Quarter
D. Dime/Dime, Quarter/Quarter, Nickel/Nickel

3. Sam spun the spinner 50 times. The spinner landed on the number one 15 times, it landed on the number two 12 times, it landed on the number three 13 times, and it landed on the number four 10 times. What is the experimental probability that the spinner will land on the number one?

3. Joe has a bag containing 10 marbles. 5 of the marbles are black, 3 or the marbles are white, and 2 of the marbles are red. He is going to pull 3 marbles out of the bag.

A. What is the probability that Joe will draw a black marble?

B. What is the probability that Joe will draw a black, a white, and a red marble?

C. The probability that all three marbles will be black is 1/8. What is the probability that Joe will NOT draw three black marbles?

Quiz
Mean, Median, Mode, and Range

Comment [N32]: Apply

1. In which set of data are the mean, median, and mode the same number?

a. {1,2,3,3,2,1,2} c. {1,2,3,1,2,3,1}

b. {1,3,3,3,2,3,1} d. {2,2,1,2,3,2,3}

2. Patrice records the number of calories she burns while exercising each day as shown below:

Day 1: 250 Day 2: 350 Day 3: 400 Day 4: 250 Day 5: 300

a. How many calories must Patrice burn on the sixth day to have a mean of 300 calories burned for the six days?

b. What is the mode of the calories burned?

c. What is the median?

3. Miss Spickelmier's classes played a game to review for the exam in which the team with the highest score receives 5 bonus points on the unit exam. The list below shows the scores for the groups in one of Miss Spickelmier's classes.

12, 8, 17, 13, 15, 14

The winning team's score went missing, but Miss Spickelmier knows that the range of the scores was 11. What was the winning team's score?

Good Luck To:_____ Period:_____ Date: _____

Probability and Statistics Exam

Unit: Probability and Statistics

Lesson: Introduction to data and data representation

Objective: Students will be able….
… Identify categorical and numerical data
… Create bar graphs and line plots
TEKS 7:11a

Materials:
Envelope with 6 questions for Concept Formations- one for each group of 4
Exit Slip- Kids rating their own understanding
Completed sets of Data from the kid's Survey
Worksheet (for homework)

Introduction:
In groups of four students will have 5-8 minutes to categorize the types of data without prior knowledge of numerical and categorical data. They should be asked to divide the types of questions or the types of answers into 2 groups.

Teaching New Material:
After students have divided the types of data the teacher will lead a discussion in how the students divided the questions up and what names they gave their group. The teacher will explain that we call questions that illicit numerical responses are used to collect "Numerical Data" and questions that illicit word responses are used to collect "Categorical Data."
The teacher will read off the other questions from the survey that students took and will ask students to categorize those questions and their responses. This discussion should take no more than 5-8 minutes.

Next, explain that both types of data can be represented using bar graphs and line plots. Show an example from the class's data survey of each type of graph and each type of data and discuss the differences in what is on the axis--Both show the frequency of a response vertically, but for categorical data, the possible responses are on the horizontal axis while for numerical data the number is on the horizontal axis.

Ask students what they notice about the shapes of the graphs showing the same data. The shapes are the same, and the axis are the same, but the graphs are different.

Finally, show students how to make both of these graphs using the data from the class's response to the question "How many letters are in your first and last name"

Guided Practice:
Students will work with their partners to make the graph with the question "What color are your eyes?" and "How many siblings do you have?" Set up the axis first as a class then allow the pairs to graph the data.

Independent Practice

If time permits allow students to begin working on the nights homework- the worksheet. For the homework students will graph a given set of data and label it as numerical or categorical.

Prior to leaving Students should fill out the self measure exit slip

Assessment:
Students will create bar graphs and line plots and will identify the data used to make those graphs as categorical or numerical

Feedback:
The homework will be graded by the teacher and will be returned within 2 class periods. The teacher will follow up with those who felt they needed more help (exit slip) during advisory or through tutoring

Questions for Concept Formation Activity

What color is your hair?

a. Brown b. Black c. Blond d. Red

What color are your eyes?

a. Brown b. Blue c. Green d. Hazel

What kinds of pets do you have? (circle as many as apply to you)

Don't Have Any Dog Cat Fish

Other:_____

How many pets do you have? _____

How much time do you spend watching TV each week?

a. Less than 1hour d. 3-4 hours g. 6-7 hours

b. 1-2 hours e. 4-5 hours h. 7-8 hours

c. 2-3 hours f. 5-6 hours j. more than 8 hours

How many letters are in your first and last name combined? _____

Name: _____ Period:_____ Date: _____

How do you feel about today's lesson?

1 2 3 4 5

(I don't have it yet) (I get it!)

Comments:

Name: _____ Period:_____ Date: _____

How do you feel about today's lesson?

1 2 3 4 5

(I don't have it yet) (I get it!)

Comments:

Name: _____ Period:_____ Date: _____

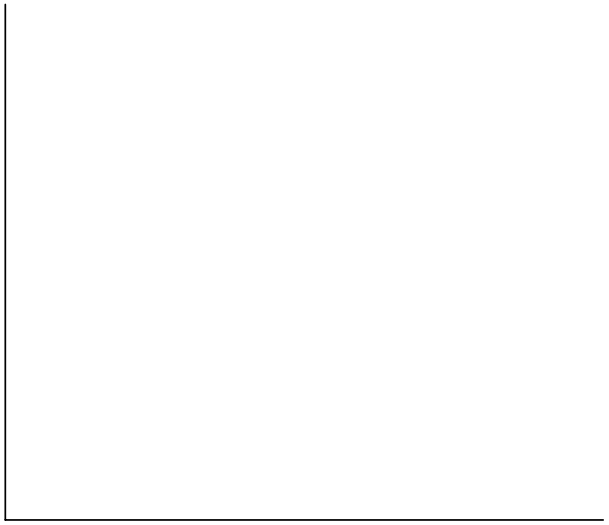
How do you feel about today's lesson?

1 2 3 4 5

(I don't have it yet) (I get it!)

Comments:

Bar Graphs and Line Plots



Name: _____ Period: _____Date:_____

Communicating Numerical and Categorical Data: Line Plot and Bar Graph

For each set of data, create a bar graph or a line plot and label the data numerical or categorical.

1. a. Create a Bar Graph. b. Is the data categorical or numerical?

Favorite Colors	
Blue	9
Green	5
Pink	5
Purple	6
Yellow	4
Red	7

2. a. Create a Line plot. b. Is the data categorical or numerical?

# of times you have traveled outside of Texas in the last 5 years	
0	6
1	5
2	4
3	5
4	2
5	1

3. a. Create a Bar Graph. b. Is the data categorical or numerical?

# of pets in home	
0	4
1	8
2	7
3	4
4	2
5	0
6	1

4. a. Create a Line Plot. b. Is the data categorical or numerical?

Favorite Subject in School	
Math	4
Reading	5
English	5
Social Studies	7
Science	6

_____

5. a. Given the list of Results, create a frequency table, then create line plot to communicate the information

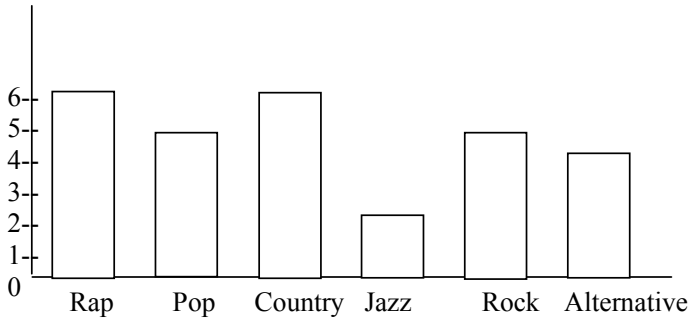
TVs in home: 3, 3, 0, 1, 2, 2, 2, 1, 1, 1, 1, 1, 2, 5, 3, 2, 1,

_____

b. Is the data categorical or numerical?

6. a. Fill in the frequency table based on the bar graph .
b. is the data categorical or numerical?

Favorite Type of Music	



Unit: Probability and Statistics

Lesson: Venn Diagrams and Circle Graphs

Objective: Students will be able to…
… Read and create Venn Diagrams and Circle Graphs.
… Determine when to use Venn Diagrams vs. Circle Graphs.
… Create Venn Diagrams and Circle Graphs
TEKS 7.11a

Materials:
2 giant Venn Diagrams and frequency tables, one of each labeled Cats, Dogs, and Fish; the other labeled Male and Female.
Warm Up- Calculating Fractions and Percentages of Data
4 Sticky notes per student
Notes Page
Examples
Homework Worksheet
Completes and Compiles Student Survey information

Introduction:
As a warm up student will review previous material as related to the day's topic- They will find what percent of a group responded each way to a question.

After the warm up, the teacher will explain that we are going to begin looking at other graphical ways to read and present information.

Teaching New Material/ Guided Practice:
Using the information from the warm up, the teacher will show students how to make a circle graph using estimation. The teacher will explain that there is a more accurate way to create a circle graph but that they will learn that later on.

The class will have a discussion of what they notice about the different sized sections of the circle graph- the circle represents the whole- all the responses to the questions and the different sections represent the parts of the whole- they are different sizes.

As guided practice, the class will create a circle graph of their gender make up. They will use one of their sticky notes and will put the sticky note in the appropriate column of the frequency chart, then as a class they will create the circle graph on their notes page

Next the class will try to make a frequency chart for the pets. This will not work because some students have more than one type of pet and some have no pets.

The teacher will then explain Venn Diagrams and how they work.

As guided practice the students will create a Venn Diagram of the types of pets they have, then as a class they will create another Venn Diagram using information about brothers and sisters on their notes page.

Next they will try to create a Venn diagram with the gender and will find that the gender doesn't overlap, so a Venn diagram is not a useful communication tool.

Again, students will answerer questions about what they notice about provided Venn diagrams.

Independent Practice:
Students will work independently on the homework.

Assessment
Given a set of data, students will choose to create either circle graphs or Venn diagrams. They will also answer questions demonstrating their ability to read both types of graphs.

Feedback:
Homework will be graded by the teacher and returned within 2 class periods.

Warm Up

Look at the set of data in the frequency chart and answer the following questions.

Favorite Patriotic Color	
Red	4
White	1
Blue	5

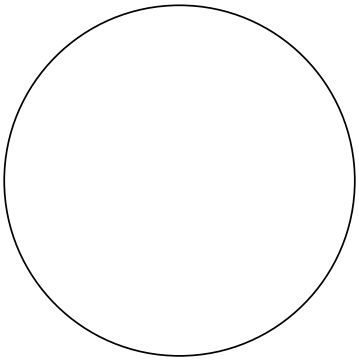
1. How many people responded to the question in all?

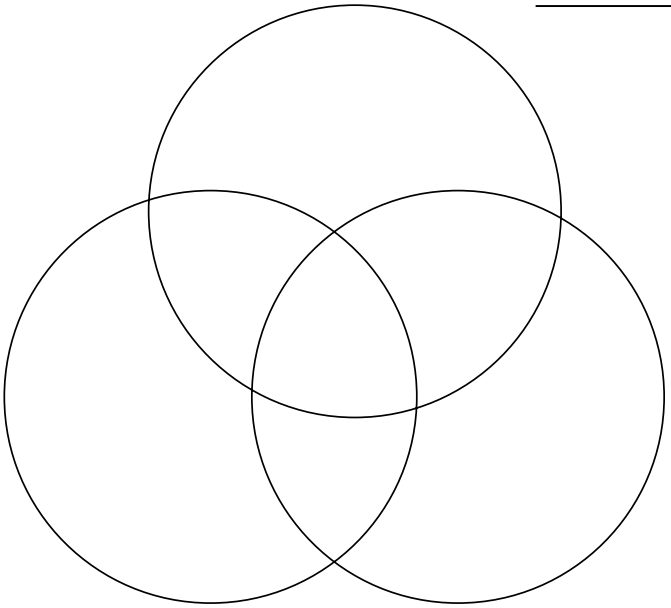
2. What fraction and percent of the people who responded like red the best?

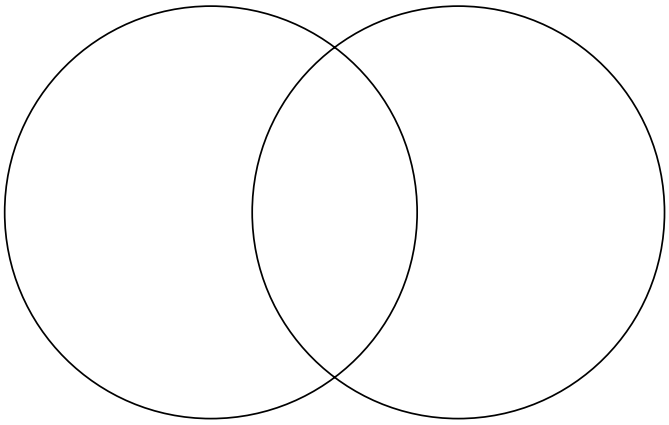
3. What fraction and percent of the people who responded like white the best?

4. What fraction and percent of the people who responded like blue the best?

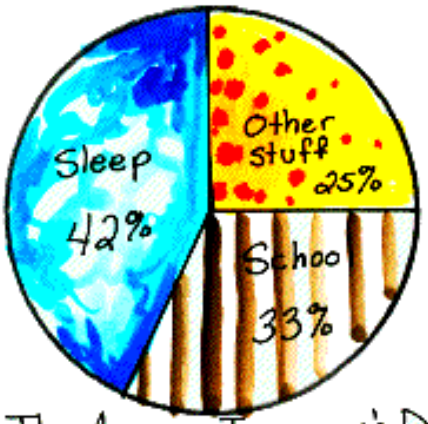
CIRCLE GRAPHS AND VENN DIAGRAMS



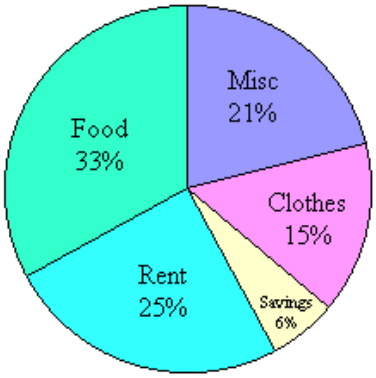


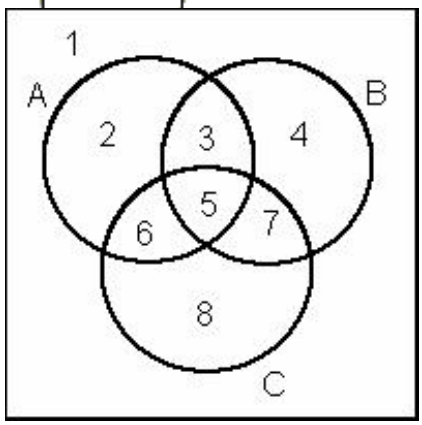


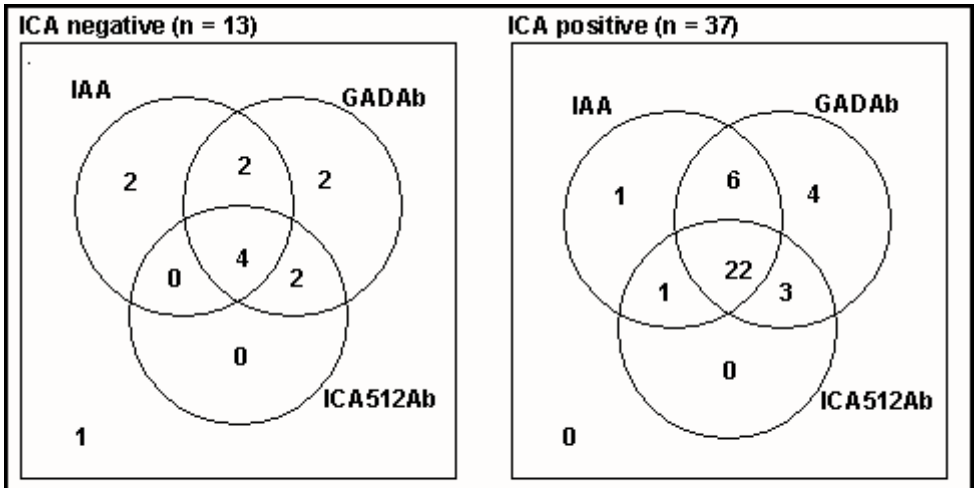
Milton Family's Budget (Title)



The Average Teenager's Day







The frequency of antibodies found in 50 relatives of IDDM patients. Initial ICA testing found 37 positive for ICA and 13 negative. Radioimmunoassay found 90% positive for GADAb, 76% positive for IAA, and 64% positive for ICA512Ab.
From Verge et al.

Venn Diagrams and Circle Graphs

1. Mrs. Allen took a survey of the types of vitamins her Trinity interns were taking to keep them healthy. Mrs. Allen made a chart with all of her intern's responses.

Intern	Vitamin
Miss Spickelmier	Multivitamin
Miss Empson	Multivitamin and C
Miss Von Hoff	Vitamin C
Mr. Demoin	None
Miss Sanchez	Multivitamin
Miss Gonzales	Multivitamin and C
Miss Murphy	Vitamin C
Miss Dougherty	Multivitamin

If Dr. Allen wanted to communicate her data using a model, should she use a circle graph or a Venn Diagram?

a. _____

Now draw the graph in the space provided.

b. Draw Graph Here

2. Mrs. Allen also asked interns where they want to teach next year. She made a chart with their responses.

Intern	Where to Teach
Miss Spickelmier	San Antonio
Miss Empson	Oregan
Miss Von Hoff	San Antonio
Mr. Demoin	San Antonio
Miss Sanchez	Dallas
Miss Gonzales	San Antonio
Miss Murphy	Houston
Miss Dougherty	Houston

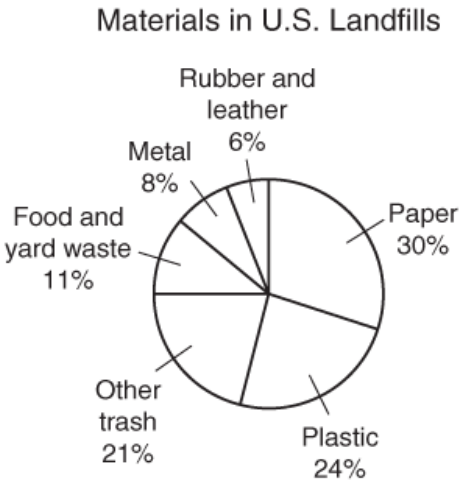
If Dr. Allen wanted to communicate her data using a model, should she use a circle graph or a Venn Diagram?

a. _____

Now draw the graph in the space provided.

b. Draw Graph Here

3. The circle graph below shows the materials in U.S. landfills.



Which of the following statements is NOT supported by the graph?

A Paper and other trash make up more than half of U.S. landfills.

B Rubber and leather and food and yard waste make up a fourth of U.S. landfills.

C The amount of plastic is triple the amount of metal in U.S. landfills.

D. The amount of paper is more than twice the amount of metal in U.S. Landfills

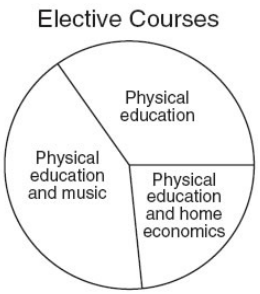
4. A counselor at Rosetta Middle School collected the following data about students taking elective courses

Elective Courses

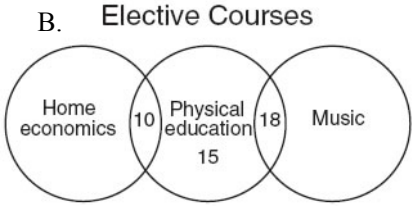
Course	Number of Students
Physical education only	15
Physical education and music	18
Physical education and home economics	10

Which graph best represent the data?

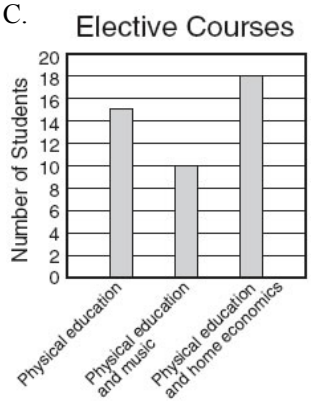
A.



B.



C.



Unit: Probability and Statistics

Lesson: Histograms and Stem and Leaf Chart

Objective:
Students will be able to read and create stem and leaf charts and histograms

Materials:
Bar Graph/Histogram Warm-up
Interactive notebooks
Blank axis for histogram and bar graph and blank stem and leaf chart for notebook.
Class responses to class data survey
Worksheet

Introduction:
Warm up- Students will examine a bar graph and a histogram and will be asked to find as least 3 differences between the two graphs. The class will generate a list of the differences they noticed.

Teaching New Material/ Guided Practice:
The teacher will explain that the bar graph and histogram are easily confused because they look different, but they show different things. A histogram always shows numerical data and each category is actually a range of numbers. We create the graphs the same way, with the number on the vertical axis and the frequency of each response on the horizontal axis. The teacher will ask kids what the two different graphs from the warm up tells them.

The teacher will show them how to graph a histogram.

Next the teacher will put the class's responses to the questions- How much TV do you watch each week and the number of people who live in their household up on the overhead and will ask which one would best be shown in a histogram. (The TV viewing question.

Students will be given an axis and will graph the data in pairs to put in their interactive notebook. They will also be given a copy of the frequency chart to paste next to it.

Next the teacher will show them a stem and leaf plot of the ages of members of a local fitness club. The teacher will explain how the stem and leaf plot works and why it is useful- it shows the distribution of the data.

The teacher will show students a list of the same group's weights and will ask how they think they should make a stem and leaf plot with the information. This will be different because the stem will be in the hundreds rather than in the tens.

Finally Students will work in their pairs to create a stem and leaf plot of their class data about the number of letters in the first and last name combined. They will cut and paste the tens digits and ones digits. The data will be listed in order from least to gratest to

make it a bit easier. The teacher must be sure to address the fact that if there is no tens digit, then the stem column should contain a 0.

Finally the class will create another stem and leaf chart of the hear rates (made up data) these heart rates will be given to them out of order

The teacher will ask students about the shape of the data in the charts they created. What types of responses occurred most often? Was the Shape the same in both charts?

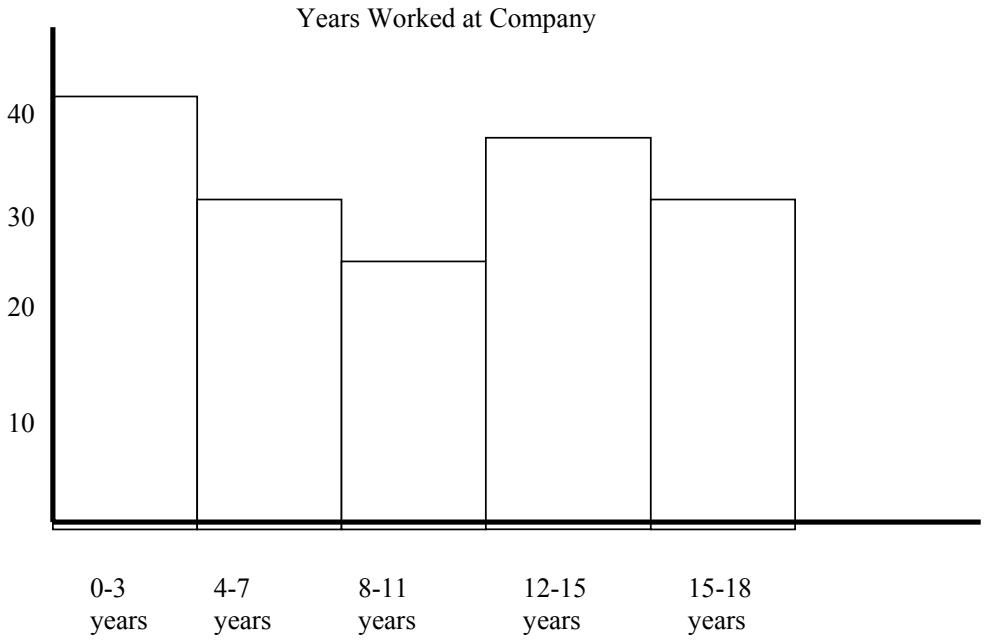
Independent Practice:
Students will complete the worksheet individually.

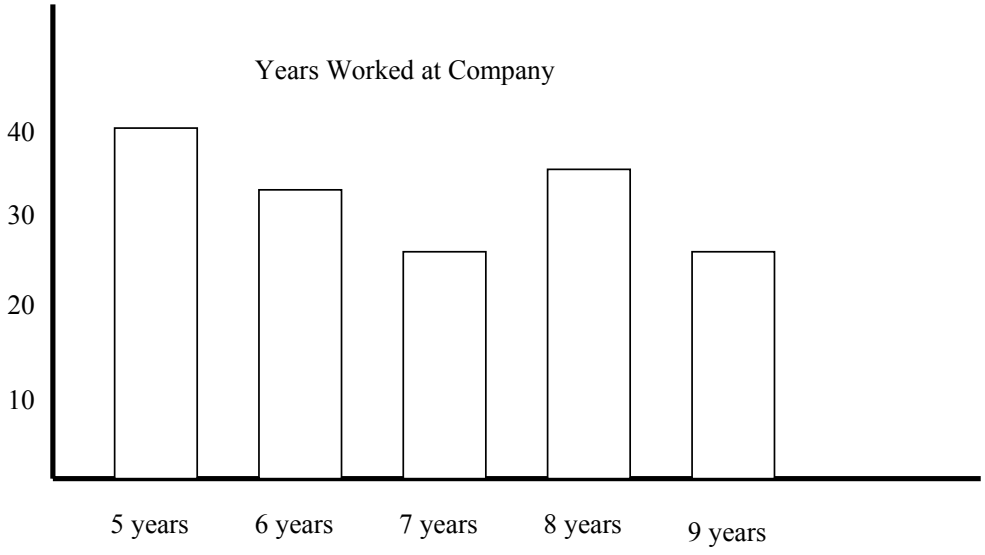
Assessment:
The worksheet will ask students to create histograms and stem an leaf charts and to answer questions about given histograms and stem and leaf charts that require them to read them correctly.

Feedback:
The worksheet will be graded by the teacher and returned within the 2 class periods.

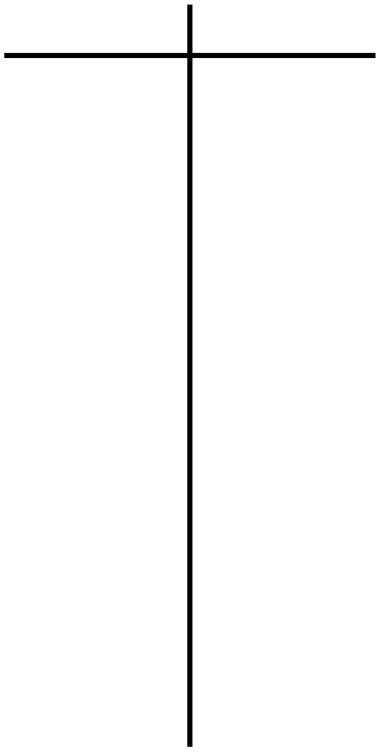
Warm Up

List 3 Differences between the 2 graphs below





Axis:



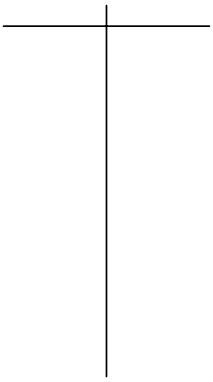
Name: _____ Date: _____Period: _____

Histograms and Stem and Leaf Charts

Fill in the frequency chart and create a histogram and a stem and leaf Chart for the following sets of data

1. The following are the ages of members of a social club for singles:
18, 23, 25, 38, 48, 26, 27, 36, 32, 40, 41, 46, 52, 41, 23, 22, 51, 19, 27, 26, 35, 36, 58, 24, 29, 34, 33

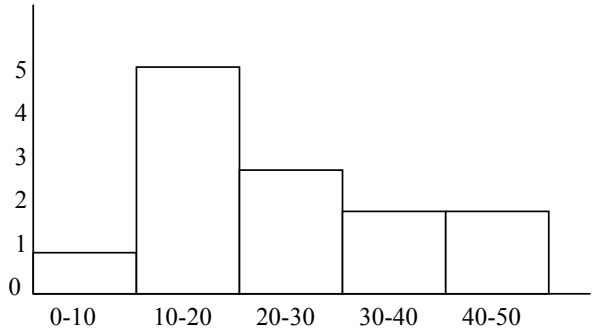
Age Range	# of Members
Below 20	
20-29	
30-39	
40-49	
50-60	



2. The following are test grades for students on a unit exam:
78, 64, 85, 55, 86, 39, 49, 84, 67, 100, 94, 74, 75, 76, 63, 77, 83, 47, 82, 54, 87, 74, 62, 72, 71, 64, 98, 57

Grade Range	# of Grades
Below 40	1
40-49	2
50-59	3
60-69	5
70-79	8
80-89	6
90-100	3

3. Which Stem and Leaf Chart Best fits the histogram?



A.

0	4
1	1, 3, 5
2	2, 4, 6
3	1, 7
4	3, 4

B.

0	5, 7
1	1, 3, 5, 6
2	2, 2, 4
3	1, 2, 3
4	2

C.

0	1
1	1, 3, 4, 7, 6
2	2, 5, 8
3	3, 9
4	4. 3

Unit: Probability and Statistics

Lesson: Sample Spaces

Objective:
Students will be able to construct sample spaces for simple and compound events.
TEKS 7.10a

Materials:
Set of Practice Problems
Menus
Card Game Problem

Introduction:
The teacher will draw on students prior knowledge and past experiences from when the class got the three baby finches.

The teacher will ask who can remember what we did- we found out all the possible combinations of gender. (When the birds joined the classroom we fist listed the possibilities for each of them- they could be male or female. Then we created a table with all the different possibilities.

Teaching New Material:
Recreate the lists and charts that the class made and tell them that what they did was make a sample space- a sample space shows all the possible outcomes.

Explain that there are three ways to find a sample space. We can make a list, like we did for the individual birds. Lists are good when there are only a few possibilities and the possibilities are obvious. (Give several examples, such as rolling a dice, flipping a coin, or spinning a spinner.)

Another way is to make a table. When making a table organization is important. Go through making a table again using the birds possibilities and showing your through process and organization.

Finally you can make a tree diagram. Make a tree diagram for each of the individual birds then for all the birds.

Explain that they need to know how to find and recognize sample spaces written in all three forms.

Work several problems in front of the class asking for feedback and allowing the problems to get progressively more complex.

Finally ask them what they notice about the number of possibilities in each event and the number of possibilities of the compound events. (You multiply the possibilities together)
Guided Practice:
Have students try several problems in pairs and go over each of the problems during the instructional period.

Next have students work in pairs to find sample spaces using the Taipei Take out Menu- each pair of students will be given a copy of a menu. The students will find all possible appetizer, entrée, dessert combinations.

Independent Practice:
Students will use their knowledge of Sample Space to solve the exemplars problem "Card Game"

Assessment:
Students will fill out an exit slip rating their understanding before leaving
Students will construct sample spaces for simple and compound events.

Feedback:
Immediate feedback will be given to students concerning problems worked in class and the exemplars problem will be graded and returned to students within 2 days of the assignment.

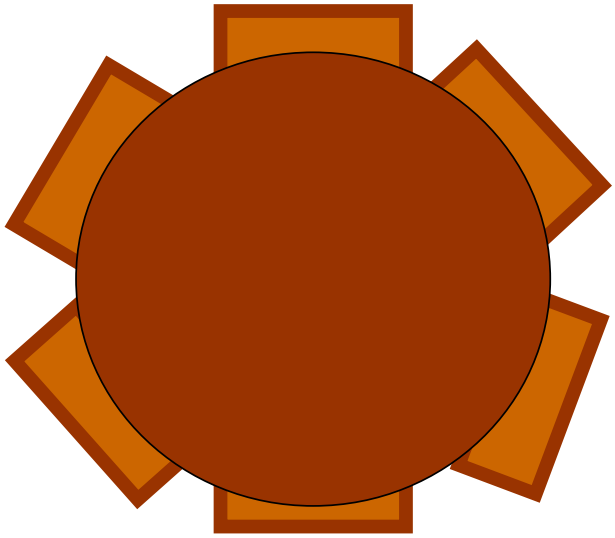
Students who feel they need more help (based on exit slip) will be pulled during advisory or will be asked to come in before or after school.

Practice Problems

- Flipping a coin
- Flipping 2 coins
- Flipping 3 coins
- Spinning a spinner
- Rolling a Dice
- Rolling 2 Dice
- Flipping a coin and rolling a Dice
- Choosing Food Items
- Choosing Outfit Options

Card Game

Every week 5 friends met for a card game. They used a table with 6 chairs. Eventually, they realized that they had chosen a different seating arrangement each week and had exhausted every possibility. How long had the friends played together?



Unit: Probability and Statistics

Lesson: Theoretical Probability

Objective:
Students will be able to calculate theoretical probability for simple events
TEKS 7.10b

Materials:
Warm Up
Rally Coach Worksheet
Worksheet

Introduction:
As a warm up, students will work a TAKS problem on sample space to reinforce the previous lesson

To hook kids on the days lesson discuss with them what they usually think of when they hear the word "probably." Explain to them that in math we have a way to find out just how probable something is. If we know what all the possible outcomes are, then we can find out just how likely a particular outcome is by calculating what we call the theoretical probability.

Teaching New Material:

Begin by putting the picture of a spinner with 4 colors equally distributed on the overhead and ask kids what the possible outcomes would be for spinning the spinner. They should be able to make a simple sample space.

Explain that since there are 4 colors there are 4 possible outcomes and since each section is the same size, each color is equally likely to occur so the theoretical probability of blue occurring is 1 (because it occurs 1 time) out of 4 (because there are 4 possibilities.

Have students find the probability of each color then ask kids what they notice when they add up the numbers- it equals one

Explain that we usually present probabilities as fractions, but we can also present them as the fraction's equivalent decimals and percents. Probability represents how sure we can be that an outcome will happen- just how probable an outcome is. – When we add them up it equals one or 100% because we can be 100% sure that there will be an outcome.

Ask kids how likely they think it is that the spinner will land on blue or green. Now we are looking at the probability of 2 possible outcomes out of 4. The probability is ½ (2/4)

Next, Show the spinner with 5 colors evenly distributed and ask what the probability is of the spinner landing on each color.

Then show spinner without the pieces evenly distributed and asks what they think the probability of landing on green (the bigger color) is. Explain that the spinner is still

divided into 5 pieces. But now 2 of those pieces are green. Because the green piece is bigger it is more likely that the spinner will land on it. Calculate the probabilities of all the colors and add them up to show that the total still equals 1.

Work out a few more examples emphasizing that they are to put the specific outcome over the total number of outcomes.

Then Tie all this back to birds. – Find out the probability of each combination using the sample space.

Guided Practice:
Students will work together on a worksheet using the rally coach structure in which they take turn answering questions and coaching and encouraging one another.

Independent Practice:
Students will work independently on the theoretical probability worksheet.

Assessment:
Students will calculate the theoretical probabilities of simple events.

Feedback:
The teacher will check in on each pair as they work and give feedback.
The worksheets will be graded and returned within 2 class days.

Warm Up

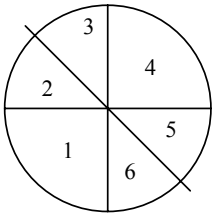
Mrs. Sheldon made lunch for her family. She made tuna sandwiches and chicken sandwiches. She made coconut cookies and oatmeal cookies. Which List shows all possible outcomes if a person picked one sandwich at random and one cookie at random?

A. (Tuna, Coconut), (Chicken, Oatmeal)
B. (Tuna, Coconut), (Chicken, Coconut), (Tuna, Oatmeal), (Chicken, Oatmeal)
C. (Tuna, Chicken), (Tuna, Coconut), (Tuna,Oatmeanl), (Chicken, Tuna), (Chicken, Oatmeal)
D. (Tuna, Chicken), (Chicken , Oatmeal), (Tuna, Chicken), (Coconut, Oatmeal)

Rally Coach: Theoretical Probability

A- Name: _____

John has is going to spin the spinner that is pictured below. Answer the following questions using the picture.



1. What are all the possible outcomes of Joe's spins?

3. What is the probability that Joe will spin a 1?

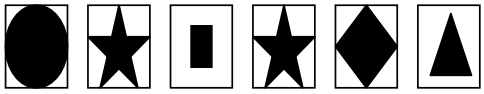
5. What is the probability that Joe will spin a 5?

7. What is the probability Joe will spin a 1 or a 4?

9. What is the probability that Joe will NOT spin a 3

B- Name: _____

Rita is going to draw a card at random out of the cards pictured below. Answer the following questions using the picture.



2. What are all the possible outcomes of Rita drawing a card?

4. What is the probability that Rita will draw a rectangle?

6. What is the probability that Rita will draw a star?

8. What is the probability that Rita will not draw a triangle?

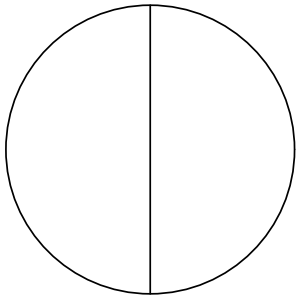
10. What is the probability that Rita will draw a circle or a diamond?

Theoretical Probability

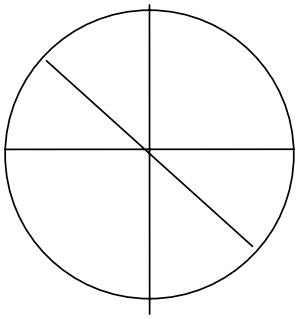
Comment [N33]: Need to color in the different areas

If Josh is playing a game where players spin the spinners and the goal is to get the color black.

Spinner A



Spinner B



Which spinner should he spin and why?

What is the probability that Josh will land on the color white if he spins spinner B?

What is the probability that Josh will land on the color white if he spins spinner A?

What is the probability that Josh will land on black or white if he spins spinner A

What is the probability that Josh will land on NEITHER black NOR white if he spins spinner B?