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| **Steps of Lesson:** **Learning Activities/Key Questions- Minute by Minute**  | **What are students doing? /Expected Responses/ Reactions**  | **Teachers response to student reactions/ Things to remember** | **Goals/Methods of Evaluation/assessment** |
| 1. Intro: What things about you do you think are hereditary?

5-10 minutes  | -Class discussion—physical traits | -Define somewhat strictly avoiding lingering on “parents”(students may be in foster care or have sensitive family situations)—things you were born with—differentiate between things that may or may not be inherited (a birth mark/mole verses hair color/height) redirect back to discussion about what is inherited.  | -Activate prior knowledge about heredity and give small amount of base knowledge  |
| 1. (After passing out sketch of hands) Instruct student clasp their hands like they are in the picture.
 | -Clasping their hands and taking note of which thumb is on top | -Assure the right clasping method was used and then ask who was R-thumbed and who was L-thumbed. -take a tally (literal tallies-not digits) of the class. And record the total right thumbed and left thumbed students on the board. | -To record   |
| 1. Has everyone voted? Can we prove it? How do you know?
 | -The number of people in the class equals the tallies on the board -Because we just counted  | -Explain that many ratios represent parts of a whole.-What did you count?What two things did you compare when you “just counted?”  | -Students demonstrate understanding through their answers to the “prove it” question.  |
| 1. The bet: “If one more student walks through the door, would you bet the student would be right or left thumbed? Give a %.
 | -Small groups-depending on class size- Students will debate/discuss among themselves for 5-10 minutes (may fluctuate)-range of percentages   | -Low %-where are you getting that from? Using the numbers can you explain?-Taking into account the given ratio of the class, ask follow up questions that would contrast to the actual representation (example if 7/13 are R we would talk about what 90%/100% or 10%/0% might look like) -Link the confidence to the ppw ratio  | -Connect the results of the class to the confidence in their bet or to the likelihood of the person walking through the door being R/L thumbed. -Being able to reference the number of either R or L as it relates to the total surveyed in support of their bet or assumption.  |
| 1. Pass out a worksheet with “ A survey of a previous class showed that they had 15 Left-thumbers and 22 Right-thumbers. Is your class more or less “Left-thumbed” than the previous class? Give evidence for your answer.
 | -Think-Pair-Share- Students attempt the opportunity on their own-then they will share with--Adding the R and L to get the whole (37)-The second class-because there are more L thumbs-because there are more -Additive comparison -Find a percent-Multiplicative comparison -Draw a picture | -Monitor frustration level and progress to determine amount of time spent individually working on the question-Does the total of students surveyed have anything to do with that reason? Could that be because there are just more people? -Pivot back to its not about the ultimate number as they exist alone, its about the relationship of the quantities as they exist together; the relationship is consistent-the parts are not independent of each other. The part-part-whole work together. - Question to illicit understanding of the quantities as the exist in relation to the “whole”-The instructor should identify students who are employing certain strategies as we are coaching individually-Have students compare and contrast various strategies arrive at the answer | -Struggle and to persevere while struggling-recognize and re-enforce -For students to understand that ppw are not independent and when comparing, the total or whole matters-Individual feedback from students as they are working alone-Monitor defense of strategies and explanations in groups or as a class-Students share on board after the individual and group time is over-Identify additive, multiplicative, %, pictures, (multiple strategies) -Able to defend reasoning when challenged |
| 1. Gooberville Arkansas: how many Left-thumbed people would you expect to find in Gooberville Arkansas, where the population is 4,180? What are the steps/logic that you used to arrive at your prediction?
 | -Think-Pair-Share -Larger number should illicit multiplicative comparison-Also be aware of responses and logic similar to the previous question  | -See above-Compare and contrast -Choose different students to come to the board to share their responses  | -Evidence of multiplicative reasoning -Able to defend reasoning when challenged -See above  |
| 1. Closing/Recap: Pass out reflection, which asks, “Give one thing you learned about ratios. Choose from the emotion faces to indicate how you felt while completing these opportunities. Why did you/do you feel that way?
 | -Complete alone first. Go around the room and each student gives a possible response. - | -Ask the class to check each student’s responses-challenge each other to see if what they are saying makes sense to each student.  | -Understand that the quantities that represent the part-part-whole ratio are connected and do not represent quantities on their own and have a consistent relationship with each other.  |

Materials:

1. Picture of thumbs clasped
2. Handout with “Second Class” opportunity
3. Handout with “Gooberville” opportunity
4. Chart paper for student responses
5. Reflection sheet- Give one thing you learned about ratios, sheet of faces with emotions for students to indicate how they felt while doing the problems/how they feel now about the problems

\*\*Note: Be aware of difficulty of second question during first lesson for a possible revision. We may want to consider using either multiples of whatever the classroom survey says or close to it. Or even make it more difficult.