Field Version of UMF Unit-Wide Lesson Plan Template

Name: Rachel Yorke	**Program:** Secondary Ed	**Course:** 460
Lesson Topic/Title: Qualitative and Quantitative Variables		
Lesson Date: 2/27/17	**Lesson Length:** 1 day	**Grade/Age:** 8th

Learning Objectives (Targets):
Students will know the difference between qualitative and quantitative variables.
Students will be able to determine if a variable is qualitative or quantitative.

Content Standards: CCSS.MATH.CONTENT.6.SP.B.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	**Content Standards Alignment & Justification:** In order for students to appropriately display numerical data, they must first understand the difference between qualitative and quantitative variables. Since certain graphs are used to represent specific types of variables, students will need to recognize the difference between the variables so they can create accurate and informative representations. Students will be given definitions for qualitative and quantitative variables and will be given several opportunities to discern between the two types, including an activity, discussion, and math journal prompt. They will also be given a Kahoot review during the following lesson on variable types.

Assessment:	**Assessment (Data & Student Feedback):**
☑Pre: Students will receive a pre-assessment after February break. The assessment will cover types of variables, types of graphs, scatter plots, and correlation. There are 11 questions covering the material and one question for students to indicate how confident they were. I will also ask students to mark any questions that they did not know, or were just guessing on. ☑ Formative: Students will write in their math journals as an exit ticket. They will be asked to describe the difference in qualitative and quantitative variables in their own words, and provide five examples of each variable type. Students will also be categorizing different variables in a t-chart with groups. □ Summative □ Student Self	Pre: I will use the results from the pre-assessment to make any necessary changes to the unit as I see fit. If the results indicate that students are struggling with one concept more than another, then the lessons can be adjusted to spend more time on the concepts necessary. Formative: I will look at students' math journals to check for understanding, and respond directly in the journal with feedback. If I notice that students are still not understanding the difference between the two types of variables, I will spend more time going over it the following day. During the lesson, while students categorize different variables, I will be able to determine how well they are grasping the content. These assessments measure proficiency, it tells me whether or not the student understands the difference between qualitative and quantitative variables.

Integration of Other Content Areas: (If appropriate)

English: Students will create and write in their math journals to wrap up the lesson. They will be asked to summarize what they have learned by describing the difference between the variable types and giving me examples. It is used as an opportunity to reflect on the lesson and practice their writing skills. Writing in math also helps students improve problem solving skills and solidify their understandings.

Instructional Strategies to Differentiate Whole Class Instruction:

This lesson has been designed to meet the learning preferences of my students. Many have indicated that they prefer hands-on, group activities. The card sort activity meets the needs of intrapersonal, verbal, visual, and kinesthetic learners. The entire lesson gives students the opportunity to work individually and collaboratively to understand the content.

Other students have indicated that they like to see examples and experience direct instruction before working with the content which is why I also included whole group direct instruction.

Modifications / Accommodations / Extensions For Individual Students with Identified Needs:

Modifications: No modifications necessary. Because this is such a short lesson, the material is accessible for all students and the standards do not need to be lowered.

Accommodations: There are a few students in each class who have ADHD. They sometimes have difficulty focusing and following directions. In the B group, students *C, D, and B* often need subtle reminders to stay on task. I typically will walk up to their desk and just tap it and that usually works. In the C group, students *A and C* also tend to get off track very easily. To accommodate these students, I will be explicit, yet simple and structured in my delivery of the content. The lesson also includes a hands-on activity to vary the pace of the instruction which should help in keeping students' attention. In the A group, student *E* has Tourette Syndrome. This student's biggest difficulty is with writing and completing tasks within the given time frame. To accommodate this, I have ensured that all of the work that is done in this lesson is either hands on or done on the computer. By doing this, this particular student does not need to write by hand. In addition, time frames for all of the tasks are flexible. If students do not complete something in class, they are allowed to complete the tasks later at their own pace. Students also have assigned seats to prevent anticipated behaviors and to easily refocus students who have difficulty with staying on task.

Extensions: Some students may be able to decipher the difference between qualitative and quantitative variables immediately. Since this is only a one day lesson, there will most likely not be many opportunities to offer extensions, however, if I notice that the whole class is quickly able to distinguish between qualitative and quantitative variables, I will go into further depth and explain what a binary and non-binary categorical variable is and what a continuous and discrete numerical variable is.

Technology Integration: (if appropriate)

I will use my laptop and projector to project notes onto the board. Students will use their laptops to create a Google Drive document that will serve as their math journals. They will then organize and write in these journals and share them with me. They will be used as an easy way to establish communication between the students and myself as I will respond directly in the journals with feedback.

ISTE Standards for Teachers

Standard 3- Model Digital Age Work and Learning: Collaborate with students, peers, parents, and community members using digital tools and resources to support student success and innovation

The students and myself use the digital math journals as a way to create a dialogue between us that guides my planning and gives them a platform for asking questions and demonstrating their knowledge in a private manner.

ISTE Standards for Students

Standard 6- Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems, and operations.

The use of math journals gives students the opportunity to demonstrate basic technological skills such as formatting and collaboration.

Materials and Resources for Lesson Plan Development

Projector
Laptop with notes
Student laptops
White board
Variable cards
Qualitative/Quantitative T-Chart
Masking tape

Teaching & Learning Sequence:

Day 1: (53 minutes)
Direct students to sit in assigned seats.
Display objectives on front board.
Introductory slideshow to quantitative and qualitative variables (15 minutes)
*Project slideshow displaying agenda and read it aloud.
*Read objectives out loud and have students copy them down.
*Ask students what "quantitative" and "qualitative" sound like (quantity and quality). Then have them predict what the difference between the variables might be.
*Explain difference between the two types of variables, giving definitions and examples.
*Explain the trick to make sure that a variable that is a number is indeed numerical (Does it make sense to take the average?)
*Ask students to think of examples of variables (check for understanding)

Variable card sort (30 minutes)
*Explain card sort activity.
* Have students break off into small groups (A, B classes will have four small groups, C will have three pairs)
* Distribute a stack of notecards with different variables on them to each group. It is the job of the students to work together to determine whether the variables are quantitative or qualitative.
* Students will then tape their notecards in the correct column in a T-chart (qualitative vs. quantitative).
* Ask the students to look over the cards and check for mistakes. Any mistakes will be discussed. (check for understanding)
* The remaining time will be spent discussing binary and non-binary variables (qualitative) and continuous and discrete variables (quantitative).

Math journal exit ticket (8 minutes)
*Students will set up their math journals using Google Docs and share with me.
*Students will use the last few minutes of class to reflect in their math journals. They will write definitions of each variable type in their own words and give five examples of each type. (check for understanding)

Content Knowledge Notes: ***(if applicable/instructor discretion)***
Qualitative variable (categorical): A quality or characteristic. Describes data that fits into categories. Example: eye color, hair color.

Quantitative variable (numerical): Quantity or number. Describes data that takes on numerical values. Example: population, shoe size

Caution: Some variables that have numerical values may be categorical variables. Trick: does it make sense to take the average of it? For example, it would make sense to be looking for the average shoe size of the class, but not the average zip code or telephone number.

Continuous variable: a quantitative variable that can take on any any value in an interval (example: weight, height)

Discrete variable: a quantitative variable that can only take on certain values (number of siblings, shoe size)

Binary: a qualitative variable that has only two categories

Non-Binary: a qualitative variable that has more than two categories

Common Core Teacher Standards (CCTS) Alignment & Justification *(Field/Student Teaching Only)*

Standard # 1 Learner Development*:The teacher understands how students learn and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences:*

To me, this standard explains my responsibility as a teacher to understand that all students learn differently and that my planning must be centered around the needs of my students. I need to design lessons that span the learning preferences of the students and ensure that they are balanced appropriately as to cater to their skill level and provide a challenge.

Description: On my first day at Madison Jr. High School, I gave my students a questionnaire to take home with them. The questions ranged from personal interest to academic preferences and gave me an insight as to how they learn best. This lesson has taken the responses from that questionnaire and included a range of instructional strategies such as direct instruction, collaboration, discussion, and individual reflection.

Performance 1(b)

Creates developmentally appropriate instruction that takes into account individual learners' strengths, interests and needs and that enables each learner to advance and accelerate his/her learning.

Rationale: Using the results from the questionnaire, I knew I needed to incorporate a range of instructional strategies to meet the learning preferences of the students. Many indicated that they prefer hands-on activities and group work, while others preferred individual work. This lesson uses direct instruction at the beginning of the class to explicitly state objectives and definitions. The card sort activity caters to the kinesthetic, verbal, visual, and intrapersonal learners and gives them the opportunity to discuss the content with others and demonstrate their understanding. The lesson then closes with a math journal entry which allows students some time to independently consider the content of the lesson and show their understanding.

Standard #7 Planning for Instruction: *The teacher draws upon knowledge of content areas, cross-disciplinary skills, learners, the community, and pedagogy to plan instruction that supports every student in meeting rigorous learning goals.*

This standard describes the range of factors I must use to inform my instructional decision making. There are multiple facets that must be embedded in lessons in order to create richer learning experiences for the students. These considerations are critical for the content to be relevant and engage students on a level that allows them to reach the learning goals.

Description: I had students create a math journal as a way to reflect upon their learning and apply skills they have acquired in writing. The students use the journals to respond to prompts, summarize their learning, and communicate with me.

Essential Knowledge 7(h)

Understands how integrating cross-disciplinary skills in instruction engage learners purposefully in applying content knowledge.

Rationale: Integrating writing in mathematics is an effective way for students to improve their problem solving and critical thinking skills. By having students summarize their learning in words, it shows a deeper level of understanding because they have to know the content thoroughly enough to explain it. It also gives them further experience with mathematical vocabulary, allows them to organize their thinking in a new way, and learn to value the power of writing.

Post-Lesson Reflection:

Overall the lesson went well and the students showed that they understood the material. The card sort activity allowed students to get up from their desks and interact with their peers and with the content on a physical level. The students were responsive to my questions and the results of the card sort activity was evidence that they are able to discern between quantitative and qualitative variables.

The only issue I ran into was that it took about half as long to do as I had planned. Next time I implement the lesson, I am going to assume that it will take me a third of the time so that I can have more planned. When doing the card sort, one group noticed that they all had quantitative variables which is not something that I had expected. In response, I took some of their cards and switched them with another groups' cards. In hindsight, I realize that I should have just left it as is. Since they recognized that they had all quantitative variables, they showed me that they understood the objectives which is the purpose of the activity.

Since the students understood it very quickly, I attempted to extend the lesson by having them notice the difference between discrete and continuous variables. I then proceeded to have them give me examples of discrete and continuous numerical variables from what I had posted on the board. If I could do the lesson again, I would create another T-chart that categorized discrete and continuous variables and have the students come up to the board and work together to arrange the variables in their respective columns. I could do the same thing when discussing binary and non-binary variables. This would give students another chance to get up from their seats and move around a bit.

After reviewing the students' math journal entries, it is evident that they recognize the difference between the types of variables and are able to determine if a variable is quantitative or qualitative. These results show that no further direct instruction is necessary on this topic, but since we are using it to guide our graphing of data, it will continue to be reviewed throughout the unit.