Anoka Hennepin K-12 Curriculum Unit Plan

Department: Elementary Math **Grade Level: Four**
Unit Title: Unit Ten- Reflections and Symmetry **Number of Lessons/Days: 8**
Unit Summary: The purpose of this unit is to understand 2-dimensional geometry transformations: rotations, translations, reflections, and symmetry. Day 8 in this unit is an opprotunity to review Data Analysis in a spreadsheet table.

DESIRED RESULTS (STAGE 1)

Program Understanding and/or Minnesota State/Local/Core Standards and Technology Standard(s) addressed:

- III. Students will understand that spatial reasoning, geometric and measurement representation is useful in solving problems and understanding our world.

MN Standards:
Geometry and Measurement
4.3.3 Use translations, reflections and rotations to establish congruency and understand symmetries.
Data Analysis
4.4.1 Collect, organize, display and interpret data, including data collected over a period of time and data represented by fractions and decimals.

Number and Operations
4.3.3.1 Apply translations (slides) to figures. **4.3.3.2 Apply reflections (flips) to figures by reflecting over vertical or horizontal lines and relate reflections to lines of symmetry.** **4.3.3.3 Apply rotations (turns) of 90˚ clockwise or counterclockwise.** **4.3.3.4 Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.**
Data Analysis
4.4.1.1 Use tables, bar graphs, timelines and Venn diagrams to display data sets. The data may include fractions or decimals. **Understand that spreadsheet tables and graphs can be used to display data.**

Overarching Understanding(s) from Curriculum Map/Course Understandings:	**Essential Question(s) from Curriculum Map. Course Essential Questions:**
Students will understand that…	***To understand, students will need to consider such questions as....***
• two-dimensional and three-dimensional shapes can be described, compared, analyzed and represented in space to interpret objects.	• How could I use geometric shapes in my life?
Topical Understanding(s) Specific to Unit:	**Topical Essential Questions for Unit:**
Students will understand that…	***To understand, students will need to consider such questions as....***
• the congruence of figures allows us to rotate, reflect, or translate objects	• How do transformations affect an object?

without changing their size or shape. • the attributes of an object can be identified, described and sketched in order to classify, compare, and communicate about the object.	• How do I know what transformation has occurred? • How do I describe the transformation of an object?
To understand, students will need to…	
• **know**… Students will need to know the following in order to… (e.g. facts, concepts, generalizations, rules, theories, principles) • reflections create images that are congruent, but the opposite or reverse of the original image • transformations (reflections, rotations, translations) maintain the congruence of the original object • the line of reflection is exactly half-way between the original object and its image • objects that are symmetrical are congruent • objects that are congruent are NOT always symmetrical • objects can have more than one type of symmetry (i.e. rotational and mirror symmetry) *Italicized words are words that students need to know for MCA testing. Please emphasize and use them often.* • **Common vocabulary:** ○ *clockwise* ○ *congruent* ○ *counterclockwise* ○ Frieze pattern ○ *image* ○ line of reflection ○ line of *symmetry* ○ preimage ○ *reflection (flip)* ○ *rotation (turn)* ○ *side* ○ symmetric ○ *transformation* ○ *translation (slide)* • **Common misunderstanding(s):** ○ When you perform a transformation, the size and/or shape of the object changes ○ Symmetry and congruence are the same thing ○ If an object does not have mirror/line symmetry, it is not symmetrical at all	**be able to…** (Students will be able to DO.. skills, procedures, processes • Sketch, identify, and describe transformations of objects • Use tools to sketch, identify, and describe transformations of objects • Identify the transformation of objects in patterns