Math-in-CTE Lesson Plan

Lesson Title: Working with Clip Art and Shapes	Lesson #
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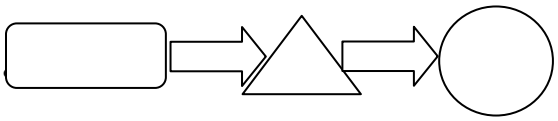
Occupational Area: Business
CTE Concept(s): Clip Art and Borders
Math Concept(s): Draw with Ratio and Proportion

Lesson Objective:	Apply graphics to enhance their document format using the principles of ratio and proportion.
Common Core State Standards	**CC.K–12.MP.6** Attend to precision. **CC.7.RP.2** Analyze proportional relationships and use them to solve real-world and mathematical problems. (Reinforce) **CC.7.RP.2b.** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (Reinforce) **CC.7.RP.3** Analyze proportional relationships and use them to solve real-world and mathematical problems. Use proportional relationships to solve multistep ration and percent problems. EX: simple interest, tax, markups and markdowns, gratuities, and commissions, fees, percent increase and decrease, percent error. (Reinforce)
Supplies Needed:	Microsoft Word *Keyboarding & Formatting* text

THE "7 ELEMENTS"	**TEACHER NOTES (and Answer Key)**
1. Introduce the CTE lesson. Clip art, shapes, and borders are graphic elements that enhance documents such as announcements, invitations, reports, and newsletters. In this lesson, we will work with these graphic elements to produce a mail-able document. a. Today we are going to focus on the ***Insert*** tab, and look at the ***Shapes*** in the Illustrations group	*Click on the Shapes command and look at the different categories:* • *Recently used shapes* • *Lines* • *Basic shapes* • *Block arrows* • *Flowchart* • *Callouts* • *Stars and banners* *Point to a couple in each category so that you are familiar with the names*
2. Assess students' math awareness as it relates to the CTE lesson. a. What do you already know about ***ratios***? b. Why is it important to keep the same **ratio** (height to width) of a graphic when changing its size?	*A ratio is a comparison of 2 quantities (numbers) by division . . . it may be written three ways: 1/100 or 1 to 100 or 1:100. (EX: miles per gallon; dollars per hour; number of nickels in a dollar, etc.)* *It is important to keep the ratio the same, otherwise the image you are working on will become skewed.*

3. Work through the math example embedded in the CTE lesson. a. Insert a *smiley face* clip art image to a document. b. Click on the smiley face to get ***sizing handles*** that will allow you to resize the smiley face. c. In order to maintain the smiley face's **proportion**, we must drag a corner handle (**dilation**); dragging a side handle will distort its size and disturb the image's **ratio.**	
4. Work through *related, contextual* math-in-CTE examples. a. Complete *Drill 1* on page 247 of your textbook.	*Insert **computer** clipart* *Size the clipart to approximately 5" wide –* ***make sure you maintain its proportion*** *On the Picture Tools Format tab, in the Arrange group, choose TIGHT from the Text Wrapping command and choose Align Center from the Align command to move the clip art to the center of the page*
5. Work through the *traditional math* examples. a. Shapes are often combined to create a more complex drawing object. Available shapes include lines, basic geometric shapes, arrows, equation shapes, flowchart shapes, stars, banners, and callouts. b. Have you ever seen or used any of the shapes named above? c. Let's complete *Drill 2* on page 248 which will have us working with **transformation, points, rotate, rectangle, right arrow, triangle, and a circle** as well as filling in the shapes w/color and adding text	*Typical mathematical shapes would be used on flyers/posters, etc.* *Insert a rounded rectangle, right arrow, triangle, right arrow, and a circle, as shown in the illustration, to your document.*  • *Fill each shape with a color as shown* • *Add text to the shapes as shown*
6. Students demonstrate their understanding. a. Complete the Application 58-d2 on page 250.	*Provide an answer key showing what the finished Application problem should look like:* • *Center the title* • *Center the subtitle* • *Key the bulleted list* • *Insert clip art using keyword* ***academic,*** *centering it below the last paragraph* • *Insert an Explosion 2 shape to the right of the clipart; add text and color as shown* • *At the bottom of the page, center the text given*

7. Formal assessment. 1. To relocate or reorient a figure without changing its shape or size use _____. a. rotation b. dilation c. reflection d. Both **a** and **c.**	1. d. both **a** and **c**
2. A dilation transformation _____. a. may reduce or enlarge the size of the object b. is an isometry c. changes the shape of an object d. changes the area of an object by a factor of k^3	2. a. May reduce or enlarge the size of the object
3. ***Application:*** • Using ***Shapes***, insert a 5-point star • Using the **points** on the sizing handles, the horizontal and vertical ruler, and dilation, resize the star so that it is 2" wide and 2" tall (maintain proportion) • **Rotate** the star 90^0 to the left • Add a **3-D effect** of your choice Source of Formal Assessments: Sample release items from ACT, ACT COMPASS, ACT WorkKeys, Center for Occupational Research and Development (CORD), National Assessment of Educational Progress (NAEP)