LIVING ROOM REDECORATION	**Student/Class Goal** Home repair is a realistic concern for many students and calculating the costs and supplies is a valuable exercise before beginning any home project. Planning a living room redecoration project presented an opportunity for the teacher to design a math learning activity.
Outcome (*lesson objective*) The student is asked to calculate area and perimeter based on the dimensions of a living room. These calculations are then used to respond to questions about supplies needed for painting and carpeting the room.	**Time Frame** 2-3 hours
Standard *Use Math to Solve Problems and Communicate*	**NRS EFL 3-5**

COPS Understand, interpret, and work with pictures, numbers, and symbolic information.	**Activity Addresses Components of Performance** Use square tiles or graph paper to demonstrate the difference between area and perimeter. Make calculations for perimeter, area, and surface area. Choose room dimensions (length, width and height) for correct values and substitute the values for length, width, and height into formulas. Use formulas and write equations for perimeter and area for different parts of the living room.
Apply knowledge of mathematical concepts and procedures to figure out how to answer a question, solve a problem, make a prediction, or carry out a task that has a mathematical dimension.	Add, subtract, multiple and divide to answer questions in Part 2. Choose appropriate formulas for Part 1, then select appropriate information and strategies when determining redecoration project. A calculator can be used to solve problems or check paper calculations.
Define and select data to be used in solving the problem.	Use the chart in Part 1 to decide which dimensions are needed to answer the questions.
Determine the degree of precision required by the situation.	Rounding is used for determining amount of paint and wall paper to purchase.
Solve problem using appropriate quantitative procedures and verify that the results are reasonable.	Check each answer to see if it is reasonable.
Communicate results using a variety of mathematical representations, including graphs, chart, tables, and algebraic models.	The completed chart and activity sheet can be placed in the portfolio for evidence of successful completion of activity.

Materials
1" square tiles
Graph & construction paper, colored pencils
Scenarios
Living Room Redecoration Chart (Part 1) & Activity Sheet (Part 2)
Calculators
Living Room Redecoration Rubric

Learner Prior Knowledge
What does the learner already know about geometry? Ask what they know about perimeter and area, making charts/lists on board about what they know and when they have used that knowledge. Discussion should include units, dimensions, notation, and applications.

Instructional Activities
Step 1 - Use this activity with any classroom configuration (e.g., large group, small group, individual). Manipulatives and calculators should be available on the work area. Introduce the rubric to students and discuss concepts that are covered in this activity.

Step 2 - Students will use square tiles to explore perimeter and area. Various rectangles will be modeled to compare perimeter and area (ex. area =24 square inches). How do perimeter and area compare? What shape rectangle results in the largest perimeter, the smallest? What generalizations can be made? How do linear and area units differ? What notation is appropriate? Why? How do

we measure circles? How does perimeter and circumference compare?

Step 3 – Students will construct a square inch and a square foot using construction paper. How many square inches are in one square foot? Cover square foot with square inch tiles for visualization. Discuss how many squares are in a square yard. Model square yard using square feet.

For students who are ready, introduce: area of triangle and circle; formulas for areas of rectangle, triangle, and circle; the concept of volume

Step 4 - For additional practice with perimeter and area, students might want to find other things in the home (rooms, bed, table, etc.) to measure or use various classroom resources The scenario examples can be given to individuals, pairs or triads as problem solving activities and additional problems can be accumulated for this activity. Encourage the use of manipulatives and chart paper.

Step 5 - When appropriate, have students work in small groups to solve Part 1 of the *Living Room Redecoration* chart. You may choose to have them complete Part 2 individually or continue group work.

Step 6 - Discuss with students what they learned from this activity, what they want to make sure to remember, or how this will be helpful in life or on the GED. They can also summarize their thoughts in their journals.

Assessment/Evidence (*based on outcome*)
Completed *Living Room Redecoration* work
Rubric
Informal observation during group activity

Teacher Reflection/Lesson Evaluation
Students struggle with differences of perimeter and area. Many activities are needed for mastery. Accurate use of notation and terms by the teacher is critical. Additional activities may need to be done in order to help the student become an independent problem solver. Students in different levels can be grouped for maximum learning, allowing students to practice problem solving skills necessary for the math section of the GED.

Next Steps
Ask the student to search the Internet for the cost of paint, carpet, and wallpaper borders during this activity. Have the student measure the length, width, and height of the classroom to use as the room dimensions for the activity. Ask the students to compare the cost of redecorating a room alone with the cost of hiring a professional to complete the task.

Technology Integration

Purposeful/Transparent
ABLE students are normally interested in working towards their GED. Many are developing life skills while working towards that goal. Mathematical problem solving and the skills necessary to compute problems are critical to both and students need to understand this.

Contextual
Putting mathematics to use in a real life context of home repair gives a sense of usefulness to the student. When using math to solve every day problems, learning becomes meaningful. Though this activity took place in the classroom, the knowledge gained could be used outside of these boundaries.

Building Expertise
Working through the process of problem solving while developing computational skills builds mathematical expertise. Increasing number sense and problem solving strategies will serve as a guide for the students to following the future.

Scenarios - To be used with manipulatives and can be set up as stations or cut apart and placed in envelopes for small group work.

A room is 12 feet long. It is 8 feet wide. Figure out how many one-foot square tiles you would need to tile the floor. You can use the graph paper to count the tiles. Or you can use the chips. Think of each chip as being the same as a one-foot square tile.

First, draw a room that is 8 feet wide and 12 feet long. The length of each grid of your graph paper should represent 1/2 foot. Then add by grouping with repeated addition to determine the number of 1 foot by 1-foot tiles that would be needed to retile the floor of this room.

First, draw a room that is 8 feet wide and 12 feet long with a 4 x 5 foot closet attached at one end on the outside of the 8x12 figure. The length of each grid of your graph paper should represent 1/4 foot. Then determine the number of 1 foot by 1-foot tiles that would be needed to retile the floor in this room, including the closet. You may use a calculator if you wish.

The perimeter of a rectangle is 9 feet. The length is 2 ½ feet long. How long is the width? Try drawing this figure.

You are planning to build 2 flower beds along the sides of your driveway. Each bed is 9 feet long and 3 feet wide. Draw this diagram using chart paper. You have decided to put cedar planks around the outside edge of each flower bed. Will you need to figure perimeter or area for that job? Explain.

Your neighbors live on a corner lot that measures 120 feet by 80 feet. They must add sidewalks along the edge of their lot next to the street. New sidewalks cost $12 per foot. How much will their new sidewalk cost? Sidewalks are 5 feet wide. They are divided into sections that are 5 feet long. How many sections will there be in a sidewalk that is 120 feet long? How much area will this new sidewalk cover?

The area of a rectangle is 48 square inches. Its perimeter is 38 inches. Find the length and width of the rectangle. Think of possible dimensions that could give you 48 sq in. Then check to see if they results in the correct perimeter.

The recreation director is in charge of getting estimates to resurface the bottom of their public swimming pool. She will need to submit the area of the pool to the city contractor. The pool has an L shape with a rectangle for free plan. Draw the pool design and assign lengths if necessary. How should the director go about finding the necessary information to complete her assignment?

Determine the number of square yards of carpeting needed to cover the floor in an 8 x 12 foot room. How much waste would there be if you have to buy carpeting by the square yard? Write a few sentences explaining your answer and your reasoning. You may use a calculator if you wish.

Living Room Redecoration

Part 1: Complete the chart by calculating the necessary areas and perimeter.

Room Dimensions	Perimeter (Floor or Ceiling)	Area of Floor	Surface Area of Walls (Including Doors and Windows)	Area of Ceiling
Length = 16 feet Width = 20 feet Height = 8 feet				

Part 2: Use the chart to answer the following questions.

1. If carpeting is $1.50 per square foot, how much will it cost to replace the carpet in the living room?

2. If one gallon of paint covers 800 square feet, how many gallons are needed to paint the walls with two coats?

3. If one gallon cost $8.99, how much will it cost to paint both the walls and the ceiling with two coats?

4. If one roll of wallpaper border contains 15 linear feet, how many rolls of trim are needed to put a border near the top of all four walls?

5. At a cost of $14.95 a roll, how much will it cost to put the border near the top of all four walls?

6. If your budget allows $500-$550 for redecorating the living room, do you have enough money? Explain your answer in 1-2 sentences.

7. If you don't have enough money, what changes could you make to the plan? Explain your answer in 1-2 sentences.

Living Room Redecoration Answer Key

Part 1:

Room Dimensions	Perimeter (Floor or Ceiling)	Area of Floor	Surface Area of Walls (Including Doors and Windows)	Area of Ceiling
Length = 16 feet Width = 20 feet Height = 8 feet	**72 feet**	**320 square feet**	**576 feet**	**320 square feet**

Part 2:

1) $480.00

2) 2 gallons of paint are needed

3) $26.97

4) 5 rolls are needed

5) $74.75

6) $31.72 over budget

7) Answers will vary.

Living Room Redecoration Rubric

Name   **Instructor**   **Site**   **Date**

Standard *Use Math to Solve Problems and Communicate*

RUBRIC SELECTION CRITERIA				
COPs	**Exemplary**	**Accomplished**	**Developing**	**Beginning**
Understand, interpret, and work with pictures, numbers, and symbolic information.	Student completes all math operations with 100% accuracy.	Student completes necessary operations with occasional basic fact errors.	Student completes some basic operations required by problem, but shows many gaps in knowledge.	Student is unable to do basic operations required in problem.
Apply knowledge of mathematical concepts and procedures to figure out how to answer a question, solve a problem, make a prediction, or carry out a task that has a mathematical dimension.	Student demonstrates ability to accurately compute perimeter, area and surface area as necessary in problem.	Student demonstrates an ability to compute perimeter, area and surface area with occasional errors.	Student seldom demonstrates ability to compute perimeter, area, and surface area.	Student is unable to compute perimeter, area or surface area.
Define and select data to be used in solving the problem.	Student correctly identifies and uses appropriate dimensions and units.	Student correctly identifies and uses appropriate dimensions and units with occasional error.	Student is able to correctly identify either appropriate dimensions or units.	Student is unable to identify appropriate dimensions and units.
Determine the degree of precision required by the situation.	Student rounds accurately in appropriate situations.	Student rounds appropriately with occasional error.	Student rounds inappropriately but is able to correct when error is indicated.	Student is unable to round appropriately.
Solve problem using appropriate quantitative procedures and verify that the results are reasonable.	All results are reasonable for situation with evidence of verification.	Results are reasonable but no evidence of verification is shown.	Some results are unreasonable with no verifications.	Results are unreasonable with no verification.
Communicate results using a variety of mathematical representations, including graphs, chart, tables, and algebraic models.	Student demonstrates ability to accurately use mathematical representations and clearly explains work.	Student demonstrates ability to use mathematical representations and explains work, but is missing some details.	Student demonstrates ability to use some mathematical representations and has difficulty explaining work.	Student is unable to use mathematical representations and explain work.

Student Comments

Teacher Comments