COVERING THE WALL
(May be used in conjunction with 7A/7B.H)

Performance Standards (7A/7B).I

Measure the dimensions of a selected wall space or room in a building trades home or new home being built by a local contractor (the classroom may be used if homes are unavailable), and determine its area; determine the maximum error present in their distance measurements and in their calculated area. Using the area calculation, determine the amount of wallpaper needed, allowing for waste, that includes consideration for repeat of pattern and width of the wallpaper.

- *Mathematical knowledge*: measure to the greatest degree of accuracy and compute area; determine the maximum error based on measurements and tools.
- *Strategic knowledge*: determine greatest degree of accuracy and solve problem using a systematic process.
- *Explanation*: explain completely what was done and why it was done.

Procedures

1. ***In order to measure and compare quantities using appropriate units, instruments and methods (7A) and estimate measurements and determine acceptable levels of accuracy (7B),*** provide students with sufficient learning opportunities to develop the following:
   - Calculate by an appropriate method the length, width, height, perimeter, area, volume, surface area, angle measures or sums of angle measures of common geometric figures or combinations of common geometric figures.
   - Determine answers to an appropriate degree of accuracy using significant digits.

   Information presented in an interior design class emphasizes that determining square footage is an important task when building a home or purchasing paint, floor covering, wallpaper, etc. Accuracy is important for purchasing the appropriate amount and minimizing waste. This assessment aligns with the National Standards for Family and Consumer Sciences Education, Standard 11.0 (Integrate knowledge, skills and practices required for careers in housing, interiors and furnishings.)
2. Provide students with the assessment task sheet.

   Use the measurement tools provided by your teacher to measure the selected wall space in the building trades home or in a home being built by a local builder (classroom wall if no homes are available), and determine its area. You will need to decide what measurements to make and be as accurate as possible using the tools provided. Explain the procedures you used and how you obtained your results. Discuss the error present in each of your measurements. Discuss the maximum error present in your calculated value for area.

   Using the square footage for the selected wall or room, determine how many double rolls of wallpaper are needed to cover the wall if the wallpaper is 24 inches wide, has a pattern repeat every 12 inches and is a direct match. The wallpaper is purchased in double rolls that are 56 feet in length.

   The wall(s) selected should contain doors and/or windows to show the students how to reduce their calculation due to this wasted space. Have students work with a partner to make measurements. Each person should write up his or her results and calculations separately. Provide the students with any convenient type of measurement tool you have available. Thirty-foot, 50-foot, or 100-foot measuring tapes would be best. Calculators may be used.
3. Use the standard scoring rubric. Give each student a score in each of the three categories. A score of 4 should indicate completely correct solutions to all parts of the problem, with complete and correct justifications of their reasoning. A 3 should represent correct or nearly correct solutions to all parts, with only minor computational errors making their solutions inaccurate; their rationale should be sound but may not be completely explained. A 2 would indicate that students have some idea about how to answer the questions but make major errors in computation and or reasoning that affect their answers. A 1 may have a correct answer for one part but generally shows little understanding in their rationale for their procedures and processes. A score of 0 generally reflects no correct responses and no logical rationale for their procedures and processes.
4. Minor errors in computation include making errors in the actual addition or multiplication or rounding incorrectly. Major errors include using the wrong operations or formulas to relate terms.

5. Each home's wall will have slightly different dimensions and shapes. Students should make sure that they account for any deviations from the general rectangular shape of the room. When judging the correctness of the student work, you should check the accuracy of their measurements and their calculations. Make sure their reporting of measurements matches the accuracy possible with the tool they used. For instance, if a measuring tape is marked in eighths of an inch, then their measurements should be accurate to the nearest eighth of an inch. They should not round measures to the nearest whole inch. Also, if that same measuring tape were used, then the error in each measurement would be plus or minus a sixteenth of an inch, since anything between the markings would be simply rounded up or down; and we assume the measurement is to be rounded to the nearest marked unit. The calculation of area involves multiplication of length times width, and thus the error will be multiplied as well. One way to calculate this error is to calculate the area using the largest actual values for each distance measured (that is if the measured amount has been rounded down the sixteenth of an inch), and then calculate the area using the smallest actual values that could have been possible. The difference in the two areas is the greatest error possible based on your measurements and tools. When purchasing wallpaper, the cost variance that exists between the minimum and maximum error is important to consider.

Examples of Student Work

- **Meets**
- **Exceeds**

Time Requirements

- Students should be allowed 10-15 minutes to complete their actual measurements
- The students should then be provided another 20-25 minutes to complete their calculations of area and write up their solutions

Resources

- Copies of the "Covering the Wall" task sheet
- Writing utensil
- Calculators may be used
- 30-foot, 50-foot or 100-foot measuring tapes
- Mathematics Rubric

NAME _____ DATE _____

COVERING THE WALL

Student Task Sheet

1. Use the measurement tools provided by your teacher to measure a selected wall space in the building trades home or in a home being built by a local builder (classroom wall if no homes are available), and determine its area. You will need to decide what measurements to make and be as accurate as possible using the tools provided.

   Using the square footage for the selected wall or room, determine how many double rolls of wallpaper are needed to cover the wall if the wallpaper is 24 inches wide, has a pattern repeat every 12 inches and is a direct match. The wallpaper is purchased in double rolls that are 56 feet in length. Report the total running feet of wallpaper needed and number of double rolls of paper to be purchased.

   Explain the procedures you used and how you obtained your results.

2. Discuss the error present in each of your measurements.

3. Discuss the maximum error present in your calculated value for the amount of wallpaper to purchase both in total running feet of wallpaper and in the number of double rolls that need to be purchased.

4. Be prepared to share your findings with the rest of the class.

MATHEMATICS RUBRIC

NAME _____ **DATE** _____

- Exceeds standard (must receive a 4 in each area)
- Meets standard (must receive all 3's or a combination of 3's and 4's)
- Approaches standard (must receive all 2's or any combination which may include a 3 or a 4)
- Begins standard (has no 3's or 4's but not all 1's)
- Absent (has all 1's and 0's)

	Mathematical Knowledge	**Strategic Knowledge**	**Explanation**
4	• Wrote the right answer. • Used math words correctly to show understanding of how math works. • Worked it out with no mistakes. • Used the right math words and labeled the answers.	• Identified all the important parts of the problem, and knew how they went together. • Showed all the steps used to solve the problem.	• Wrote what was done and why it was done. • If a drawing was used, all of it was explained in writing.
3	• Knew how to do the problem, but made small mistakes.	• Identified most of the important parts of the problem. • Showed most of the steps used to solve the problem.	• Wrote mostly about what was done. • Wrote a little about why it was done. • If a drawing was used most of it was explained in writing.
2	• Understood a little, but made a lot of big mistakes.	• Identified some of the important parts of the problem. • Showed some of the steps used to solve the problem.	• Wrote some about what was done or why it was done but not both. • If a drawing was used, some of it was explained in writing.
1	• Tried to do the problem, but didn't understand it.	• Identified almost no important parts of the problem. • Showed almost none of the steps used to solve the problem.	• Wrote or drew something that didn't go with the answer. • Wrote an answer that was not clear.
0	• No answer attempted.	• No strategy shown.	• No written explanation.
Score			