

Name: _____ Period: _____ Partners: _____

Do You Measure Up?

"When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science."

- Lord Kelvin 1824-1907

Physics is a science of measurement. It is important that all measurements are taken as accurately as possible and recorded in a manner, which conveys to the reader the extent of the accuracy of the measurement.

OBJECTIVE

You will make measurements as accurately as possible. You will record these measurements with the correct number of significant figures. You will complete simple calculations using the rules for significant figures using only a ruler and a block of wood.

DIRECTIONS

Complete all questions in sentence form. Use a separate sheet of paper if you do not have enough room to answer the questions in the space provided. Show all calculations on a separate sheet of paper. **For all your calculations and measurements you must use the correct number of significant figures. Make sure you include units for your entered data.**

PROCEDURE

1. What is meant by the term "significant figures"? What is the purpose of significant figures?
2. What is the term "least significant figure" mean?
3. Measure the length in millimeters and width in centimeters of the largest side of the block of wood. Do not put any marks on the wood. Write your measurements to the appropriate least significant figure in the table below. Make sure you include the appropriate units in the table.
4. Measure the height of the block in decimeters and write it in the table below:

| | |
|--------|--|
| Length | |
| Width | |
| Height | |

5. How many significant figures would the answer to a calculation of the perimeter of the top surface? Explain why?
6. Calculate the perimeter of the TOP surface in cm. Show all your calculations in your homework notebook. Enter your answer with units in the table on the next page.
7. If you convert the perimeter of the top to m, what happens to the number of significant figures in the perimeter? Explain.
8. Perform the conversion and enter it into the table on the next page. Show your work in your homework notebook.

| | |
|------------------|-----------------|
| Perimeter | cm |
| Perimeter | m |
| Top Surface Area | cm ² |
| Top Surface Area | m ² |
| Volume | cm ³ |
| Volume | m ³ |

9. What formula do you use to find the surface area of the board?

10. How many significant figures will the surface area of the top surface have? Explain your rationale.

11. Calculate the surface area of the TOP surface in cm². Show all your calculations in your homework notebook. Enter your answer in the table above.
12. If you convert the top surface area to m², what happens to the number of significant figures in the surface area? Explain

13. Convert the surface area to m². Show all your calculations in your homework notebook and write your answer in the table above.
14. Calculate the volume of your block in cm³ and m³. Show all your calculations in your homework notebook and write your answer in the table above.
15. In determining the volume of the block, which measurement determines the number of significant figures in the answer? Why?

16. In the space below, write a conclusion that includes a discussion the rules you applied when determining the number of significant figures in each calculation, identify how the number of significant figures changed in each calculation and summarize what happens to the accuracy of your data as you perform more and more complex calculations.