STEM Algebra 2 Hand Warmer PBL Name:

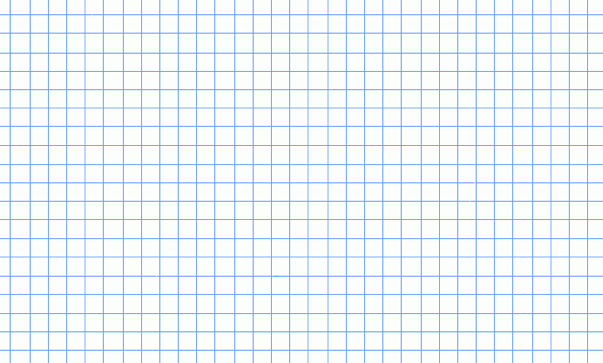


INTRODUCTION to SPECIFIC HEAT CAPACITIES

Heating Substances in the Sun: The following table shows the temperature after 10 grams of 4 different substances have been in direct sunlight for up to 60 minutes.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time (minutes) | Air ( ) | Water ( ) | Sand ( ) | Metal ( ) |
| 0 (initial) | 15°C | 15°C | 15°C | 15°C |
| 15 | 18.9°C | 16.2°C | 20°C | 25°C |
| 30 | 22.5°C | 17.5°C | 24°C | 34°C |
| 45 | 26.2°C | 18.8°C | 31°C | 43°C |
| 60 | 30°C | 20°C | 36°C | 55°C |

1: Create line graphs for each substance.



2: What family function do these graphs belong to? How can you tell?

3: Create equations for the graphs above. Be sure to label each one.

4: What does the independent variable in your equations represent?

5: What does the dependent variable in your equations represent?

6: What does the slope represent for the equations you created above?

7. What does the y-intercept represent in your equations above?

8. Given your equations above answer the following questions: Show your work!

Don’t forget…

x = time

y = temperature in Celsius

Round all your answers to the nearest hundredth.

a. How hot would the sand be in 90 minutes? Give your

Celsius to Fahrenheit

Conversion:



answer in Celsius and Fahrenheit.

b. How hot would the metal be in 2 hours? Give your

answer in Celsius and Fahrenheit.

c. How long would it take for the water to reach 43°?

d. How long until the air would be at 50°?

e. Playground safety experts claim that you can get burned in seconds on any toy over 49° C. How long will it take for a metal slide to be unsafe in the conditions in our example?

f. How hot will the sand be in 2.5 hours?