$\qquad$ Date: $\qquad$ Class: $\qquad$

## Hot Chocolate Worksheet

1. Prediction: At what temperature would it be BEST to drink hot chocolate? Make an estimate in ${ }^{\circ} \mathrm{C}$.
2. Prediction: Assuming you start with boiling water ( $100^{\circ} \mathrm{C}$ ), how long do you think it would take for hot chocolate to cool to that ideal drinking temperature?

3. Why did you choose this time? What factors did you take into account?
4. After receiving the boiling water, carefully mix the hot chocolate mix into the water. Don't drink it! Be ready to use a thermometer to measure its temperature at the times listed in the table below. Record your data in the table.

| Time After Mixing | Temperature $\left({ }^{\circ} \mathrm{C}\right)$ |
| :---: | :--- |
| 0 minutes |  |
| 2 minutes |  |
| 5 minutes |  |
| 8 minutes |  |
| 11 minutes |  |
| 13 minutes |  |

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5. Graph your data on the grid below.

6. What do you notice about the graph? What do you wonder?
7. How long did it take for the hot chocolate to reach the time you predicted? (It is okay to estimate an answer.)

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Research shows that the optimal temperature to drink a hot beverage is $57^{\circ} \mathrm{C}$.
8. Write an exponential regression equation that models the temperature of the hot chocolate vs. time. Round each of your coefficients to the nearest thousandth.
9. Find the correlation coefficient, rounding it to the nearest thousandth. Explain how well your regression models your data.
10. Determine when, to the nearest second, the hot chocolate reaches $57^{\circ} \mathrm{C}$.

