Figure 2
Step 10: Use only the stirring rod—not the thermometer—to stir the water in the calorimeter.

9. Place the calorimeter and stirrer on the balance, and carefully add 100 g of the water. Record the mass of the water in your data table. Replace the cup in its insulating shell, and cover.

10. Use the thermometer to measure the temperature of the sample when the water is boiling and the sample reaches a constant temperature. Record this temperature as the initial temperature of the metal sample. (Note: When making temperature readings, take care not to touch the hot plate and the water.) Use the hand-held magnifying lens to measure to the nearest 0.5°C. Make sure that the thermometer bulb is completely surrounded by the metal sample, and keep your line of sight at a right angle to the stem of the thermometer. Carefully remove the thermometer and set it aside in a secure place.

11. Use the stirring rod to gently stir the water in the calorimeter, as shown in **Figure 2. Do not use the thermometer to stir the water.**

12. Place the second thermometer in the covered calorimeter. Measure the temperature of the water in the calorimeter to the nearest 0.1°C. Record this temperature in your data table as the initial temperature of the water and calorimeter.

13. Quickly transfer the sample to the cold water in the calorimeter and replace the cover. Use a mitt when handling the metal heating dipper. If you are not doing any more trials, make sure the hot plate is turned off. Otherwise, make sure there is plenty of water in the heating vessel, and do not leave the hot plate unattended.

14. Use the stirring rod to gently agitate the sample and stir the water in the calorimeter. **Do not use the thermometer to stir the water.**

15. Take readings every 5.0 s until five consecutive readings are the same. Record the highest reading in your data table.

16. If time permits, make additional trials with other metals. Record the data for all trials in your data table.

17. Clean up your work area. Put equipment away safely so that it is ready to be used again.

ANALYSIS

1. **Organizing Data** For each trial, calculate the temperature change of the water and calorimeter.

2. **Organizing Data** Use your data for each trial.

   a. Calculate the energy transferred to the calorimeter cup and stirring rod as heat, using the value for the specific heat capacity you found in step 3.

   b. Calculate the energy transferred to the water as heat.