Science Surprises

Grade 5 Name: _____

Read the story carefully. Then answer each question below in a full sentence.

Science is full of cause and effect! Identify what action was taken, what reaction happened, and trace the whole chain of events.

The Melting Polar Bears

Leo had a magnificent ice sculpture of a polar bear, his entry for the school's "Science Surprises" exhibit. He needed to demonstrate how quickly ice could melt under different conditions. For his first experiment, he placed one identical polar bear sculpture, named "Frosty," on a black asphalt driveway in direct sunlight. Next to it, he placed another, "Chilly," on a white picnic blanket under the shade of a large oak tree.

Within an hour, Frosty was already a puddle, its once proud form reduced to a small, sad lump. The dark asphalt absorbed the sun's heat, transferring it directly to the ice, and the intense sunlight provided ample energy for the phase change. Chilly, however, remained mostly intact, dripping slowly. The white blanket reflected much of the sun's energy, and the shade blocked direct solar radiation, keeping the temperature around it much cooler.

Not satisfied, Leo decided to introduce a third variable. He brought out a third polar bear, "Salty," and placed it on the black asphalt next to where Frosty had been. This time, he sprinkled a generous amount of rock salt all over Salty's surface. To his amazement, Salty began to melt almost immediately, even faster than Frosty had in the direct sun. The salt dissolved into the thin layer of water already on the ice, creating a brine solution. This solution had a lower freezing point than pure water, causing the surrounding ice to melt to try and reach that new, lower freezing point.

Leo carefully recorded his observations. He realized that not only did sunlight and surface color play a huge role, but adding certain substances could dramatically accelerate the

melting process. His polar bears might have vanished, but his understanding of thermodynamics and chemistry had solidified.

COMPREHENSION QUESTIONS

(1) Which of these BEST explains why Frosty melted faster than Chilly? Circle the correct answer.

(A) Chilly was made of a different type of ice.

(B) Frosty was in direct sunlight on a dark surface, absorbing more heat.

(C) Chilly had salt added to it. (D) Frosty was smaller than Chilly.

(2) Complete the sentence: Because _____, Salty began to melt almost immediately.

(3) What effect did the white picnic blanket have on Chilly's melting speed?

(4) Describe how placing Frosty on the black asphalt in direct sunlight led to its rapid melting.

(5) What might have happened if Leo had placed all three ice sculptures on a white surface in the shade? Explain.