

The Mitten Problem – Grades 10-11 Responses (N=23)

(* Note: transcribed word for word from student work. No changes were made to spelling, grammar, and punctuation.)

Response A (The thermometer inside the mitten will have a lower temperature reading than the thermometer on the table.):

Student #1: Because the mit doesn't allow heat to pass through as much and is shaded from the sun's heat I think just the thermometer on the table will be hotter cause of the sun's heat

Student #2: It will be cooler inside the glove because it doesn't have the sun hitting on it. But it depends.

Student #3: A thermometer does not radiate heat. A mittin is a type of insulator therefore no heat is produced to have an increased heating effect. Less of the room temperature is likely to enter the mittin while as dark enclosed places with less heat every one not likely to be warmer than the outside room.

Student #4: I think that it will have a lower temperature because it will be hidden from sun and light. It will not become warmer because the thermometer does not generate heat that would be trapped by the mitten.

Response B (The thermometer inside the mitten will have a higher temperature reading than the thermometer on the table.):

Student #5: The mitten captures heat inside of it and it stays warm. Also inside of the mitten is a condensed area so the warm air particles will be close together and not mixed among cold air particles inside of the room.

Student #6: Because the mitten will act like a sauna, it traps the heat, so the thermometer inside the mitten will probably be a little bit warmer than the thermometer outside the mitten.

Student #7: The temp will go up in the mitten because it's trapped more heat inside it.

Student #8: The mittens are kept to keep your hands warm around the cold. Like wool for example. The table it doesn't provide much cover for the thermometer to get warmer. So the thermometer will be warmer in the mitten, then on the table.

Student #9: I think the thermometer inside the mitten will be higher because a mitten is supposed to keep things warmer, and "capture" heat and keep it in.

Student #10: I think the mitten will be warmer, it will absorb more heat because it is more enclosed and a smaller area for heat to escape once it has entered.

Student #11: Gloves are supposed to keep you warm.

Student #12: The mitten will gain heat.

Student #13: I think the mitten temperature will be higher because the mitten is insulated so it will hold the heat in more and lose heat less that's why temperature will be higher.

Student #14: I think it's B because the mitten will most likely heat up the thermometer more because mittens are made to heat your hands.

Student #15: I believe that the mitten's thermometer will have a higher reading. Heat generates in an enclosed space, and the mitten does have a hole, yes, but heat will gather inside of it.

Response C (Both thermometers will have the same temperature reading.):

Student #16: Both thermometers will have the same temperature reading because the room temperature is able to go inside the mitten to make it the same temperature. The opening of the mitten was still open the whole time during the experiment.

Student #17: I think both thermometers will have the same temperature reading because the thermometer inside the mitten is not completely covered by the mitten and there is air following and out.

Student #18: I think they will be the same because inside a mitten it will catch the heat like the house could so they'd be the same temperature.

Student #19: I will be th same because mittens trap body heat and that is how th keep us warm.

Student #20: Although mittens warm your hands, its actually your body heat that heats it up and the mitten traps most the heat, however there is not heat source for this experiment.

Student #21: Because theres no heat source inside the mitten to make it warmer or colder making them the same.

Student #22: I think that because when the thermometer is inside the mitten air from the room will circulate through the mitten. There could be a slight chance the reading could be higher but I think it will be around the same temp.

Student #23: Because of the room temperature most things that do not produce heat will make it any different. So the temperature will stay the same.

The Mitten Problem: Keeley, P., Eberle, F., & Farrin, L. (2005). Uncovering student ideas in science (vol 1). Arlington, VA: NSTA Press. (pp. 103-108)