

Training Header Sheet with Change Log Form**Kentucky Academic Standards**

Science

Operational 2018

SC071602_05

Particle Motion

Practice Sets

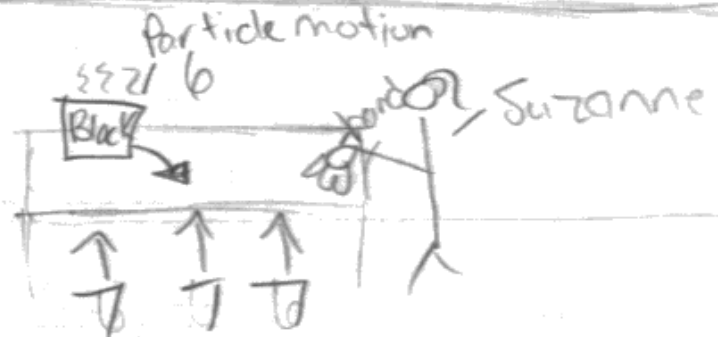
Date	Comments	Version
3/2018	Initial Operational Training Set	Set A
5/2018	Final Operational Training Set	Set B

Particle motion is represented on a scale of 1-10 with 10 being the highest.



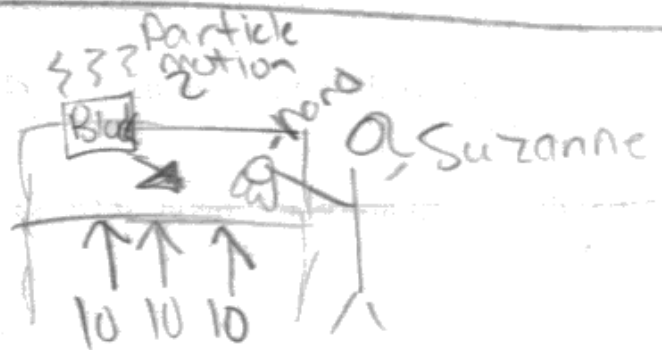
5 mins after the table

Particle motion is represented on a scale of 1-10 with 10 being the highest.



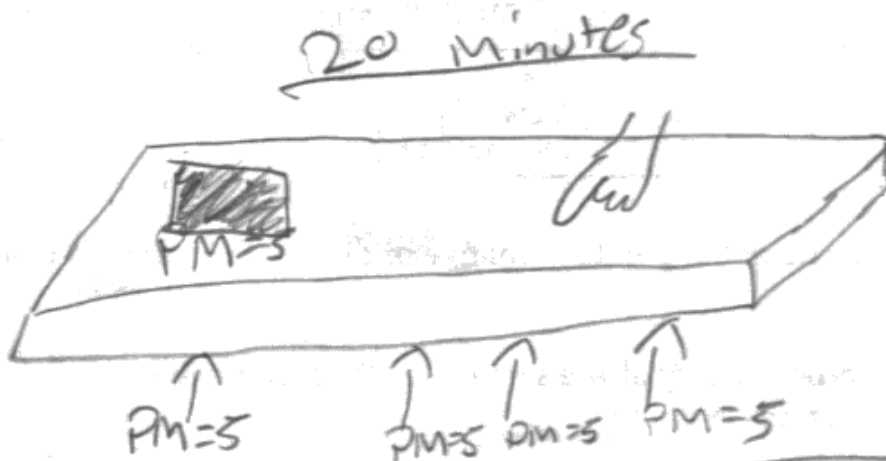
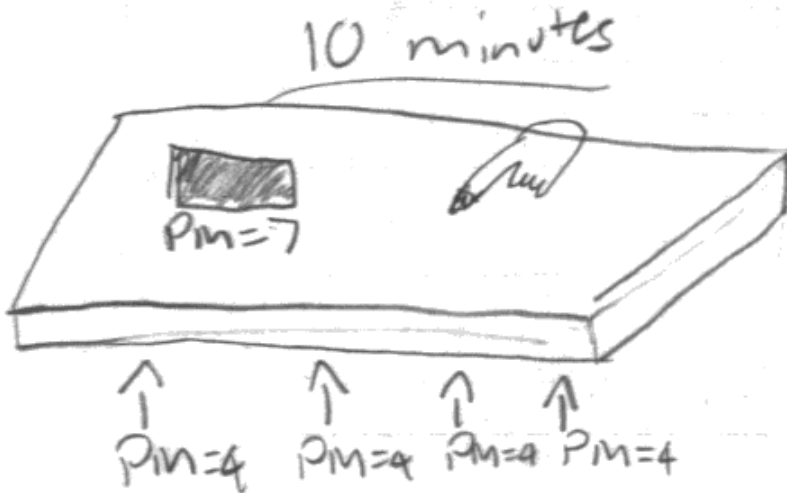
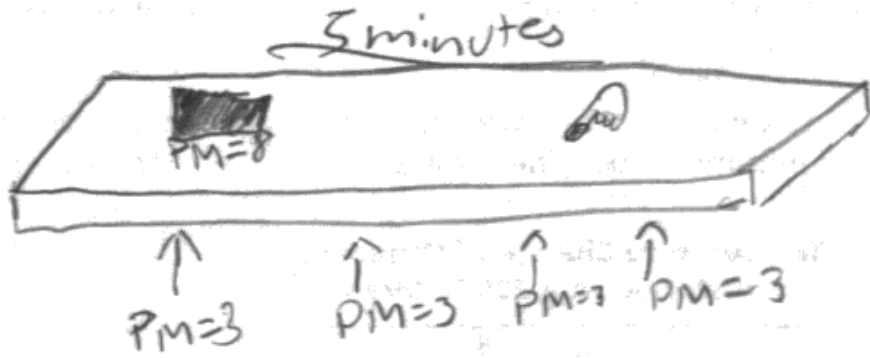
10 mins after the block is placed on the table.

Particle motion is represented on a scale of 1-10 with 10 being the highest.



20 mins after the block is placed on the table.

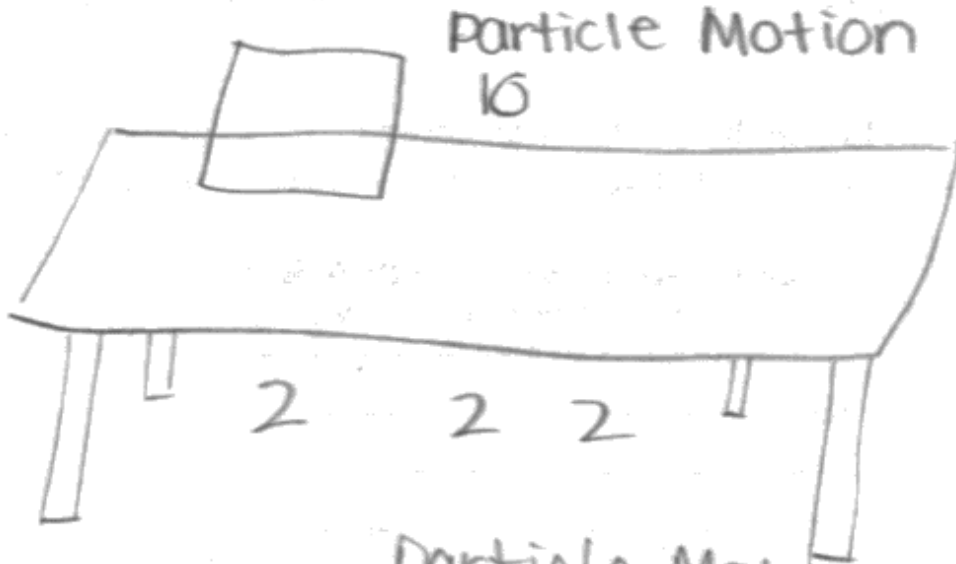
The models support the teacher's claim because the particle motion is also kinetic energy. Also, when the heat is transferred to Suzanne's hand it shows the differences between the particle motions.



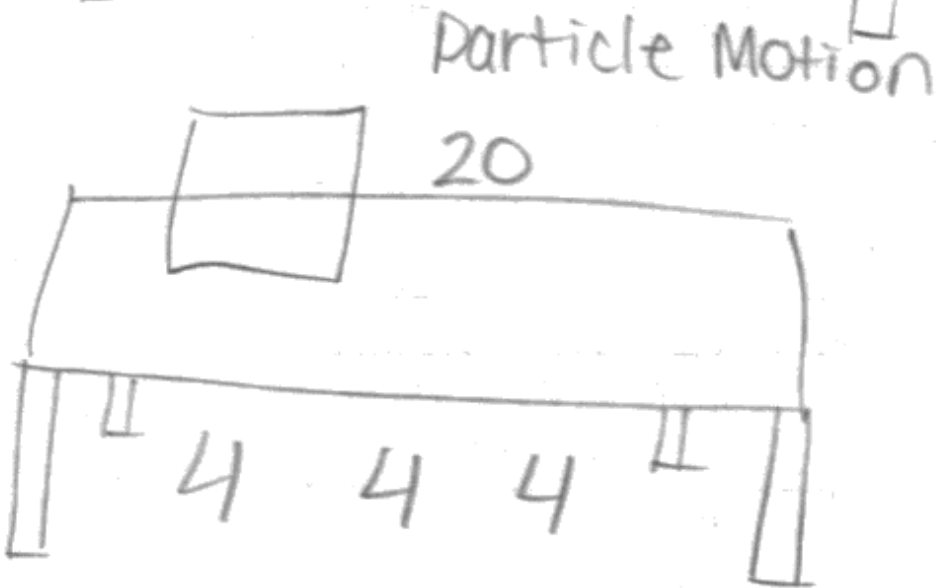
When the heated block was placed on the wooden table, the heat immediately began conducting to the table. As time went on, the block began to lose the heat, and the table gained it. Since the block had the most kinetic energy, it transferred some energy through the particles on to the wood, and then on to Suzanne's hands.

<p>Particle movement 1-12</p>	<p>5 min</p>	<p>The energy is being transferred from the heated metal block to the table. With the hand touching the table they will notice the temperature of the table increasing. But really the table is transferring energy to the hand to make it feel the heat. The reason it's warm is because when energy is added</p>
<p>Particle movement 10</p>	<p>10 min</p>	<p></p>
<p>Particle movement 7</p>	<p>20 minutes</p>	<p></p>

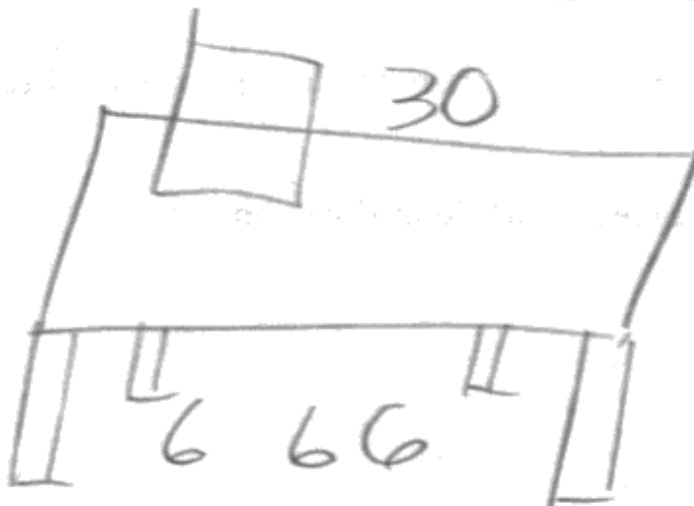
to an object the particles move faster and that creates heat. So the teacher claim was right about the transferring energy to the hand.



5 min

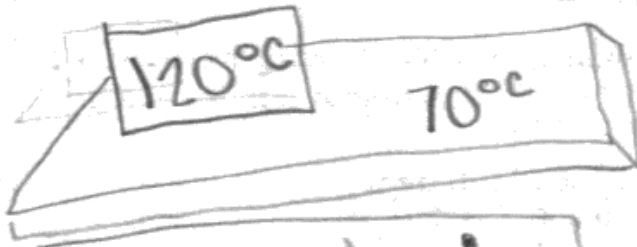


10 min



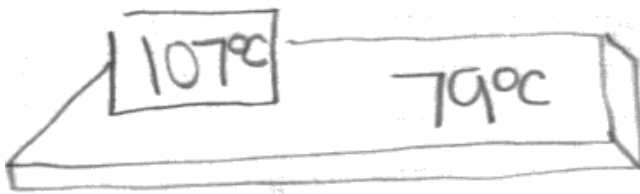
20 min

5 minutes:



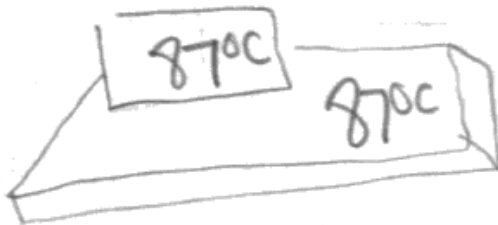
- after 5 minutes the block heated the table 50°C and the block cooled 80°C

10 minutes:



- after 10 minutes the block heated the table 90°C and lost 90°C after the 5 minute check.

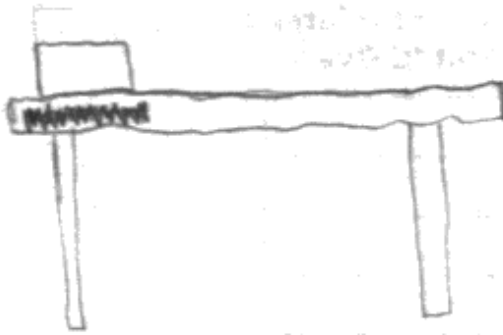
20 minutes:



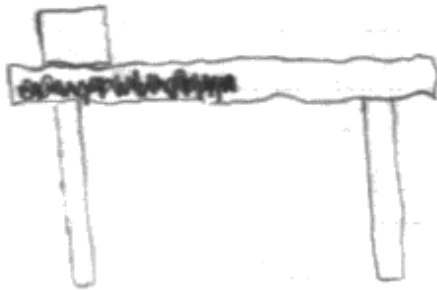
- after 20 minutes the block heated the table 20°C and lost 11°C since the 10 minute check.

So the energy transfer is that the block loses more temperature than what its giving the table; so the particles also travel faster in the table faster each time b/c when a solid is hot, the molecules expand and get faster.

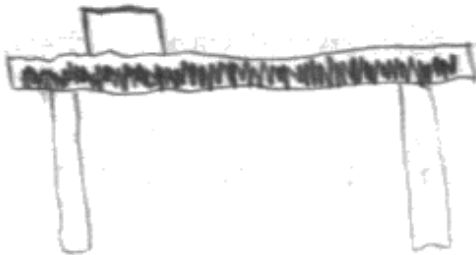
5 minutes



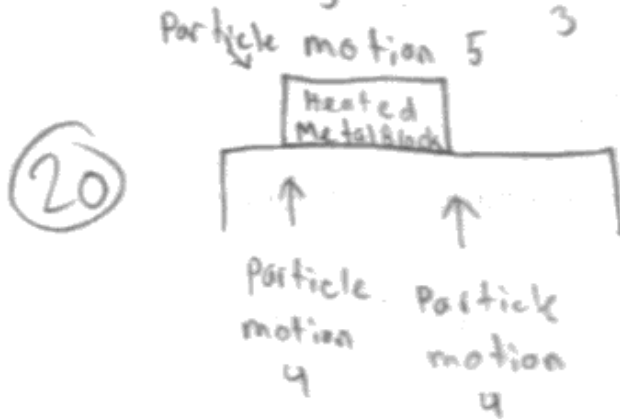
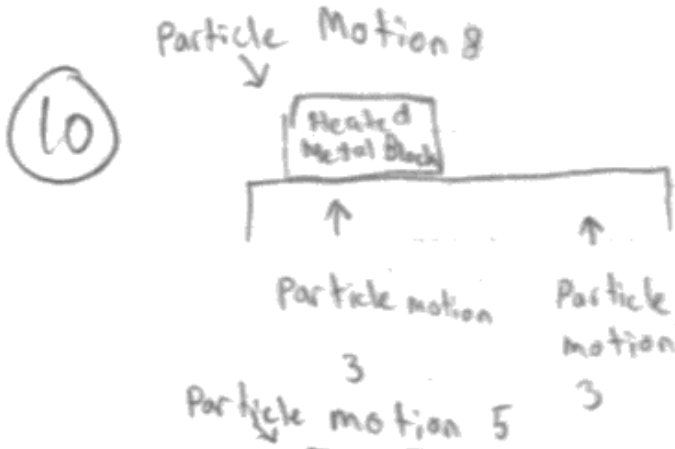
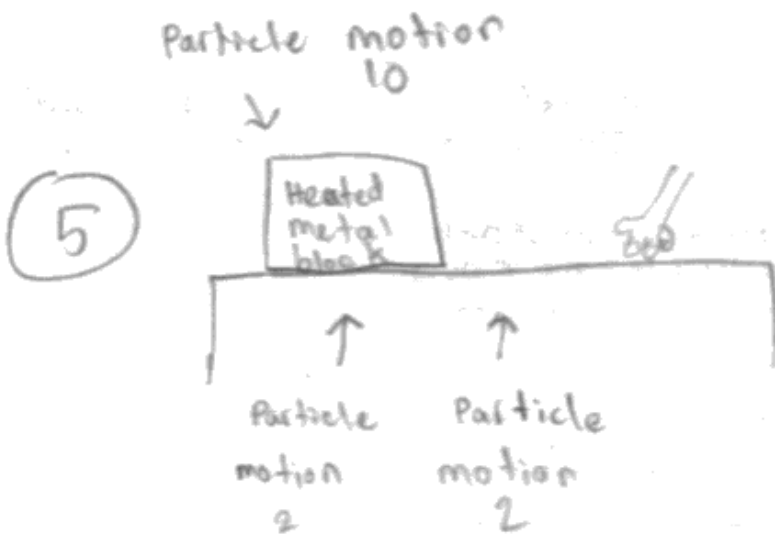
10 minutes



20 minutes



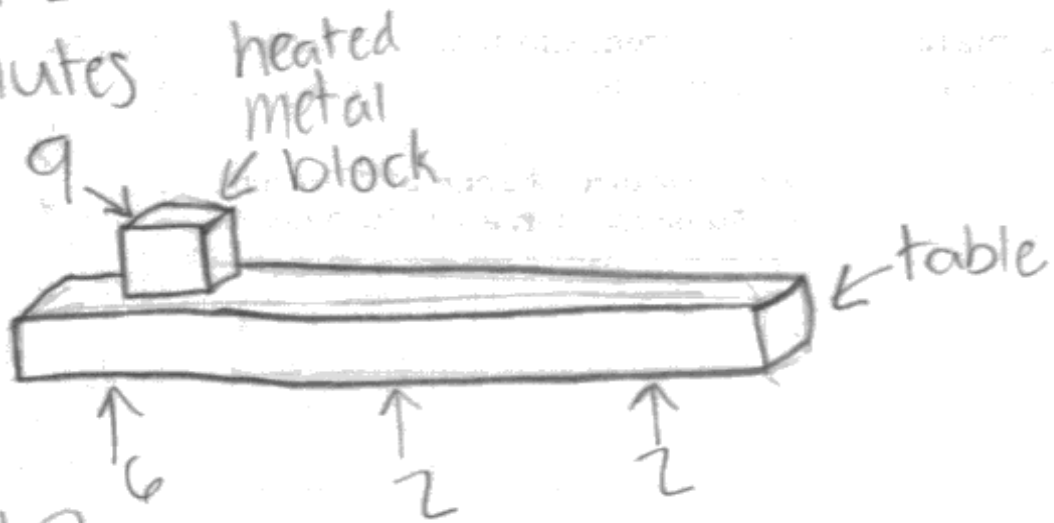
The shaded part of the table represents how heat is being transferred through the table in a period of 5, 10, 20 minutes



As the temperature goes lower on the block the less energy it transfers. When something is hot, the particles are really fast and then as it cools the particles go slower.

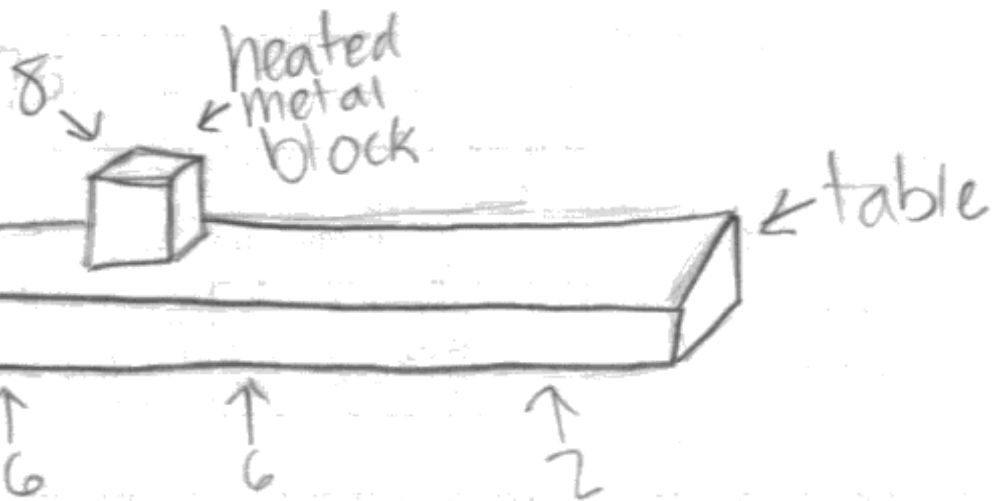
Model 1.

5 minutes



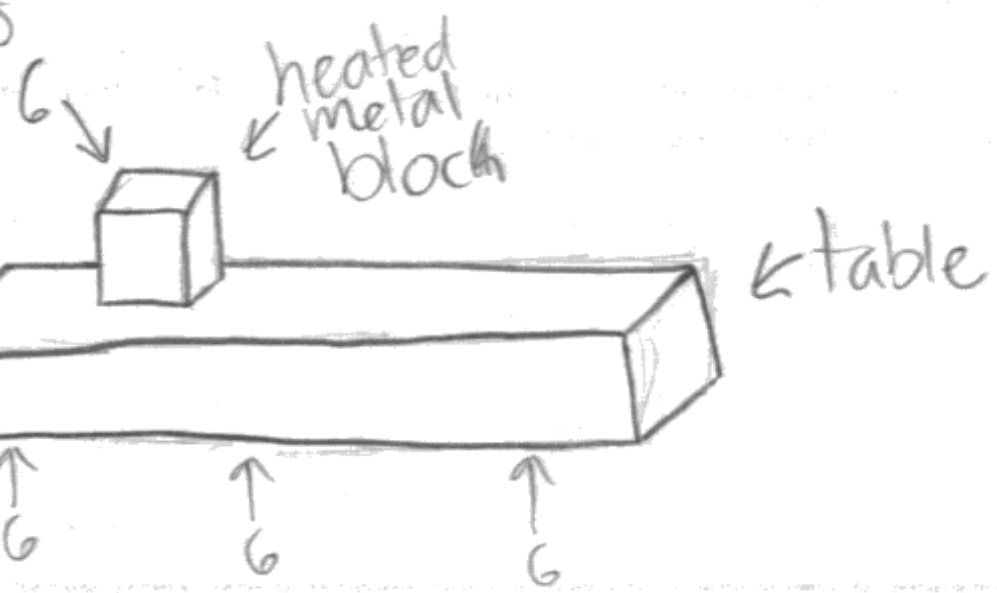
Model 2.

10 minutes



Model 3.

20 minutes



5min

In this one the particles are starting to move.



10min

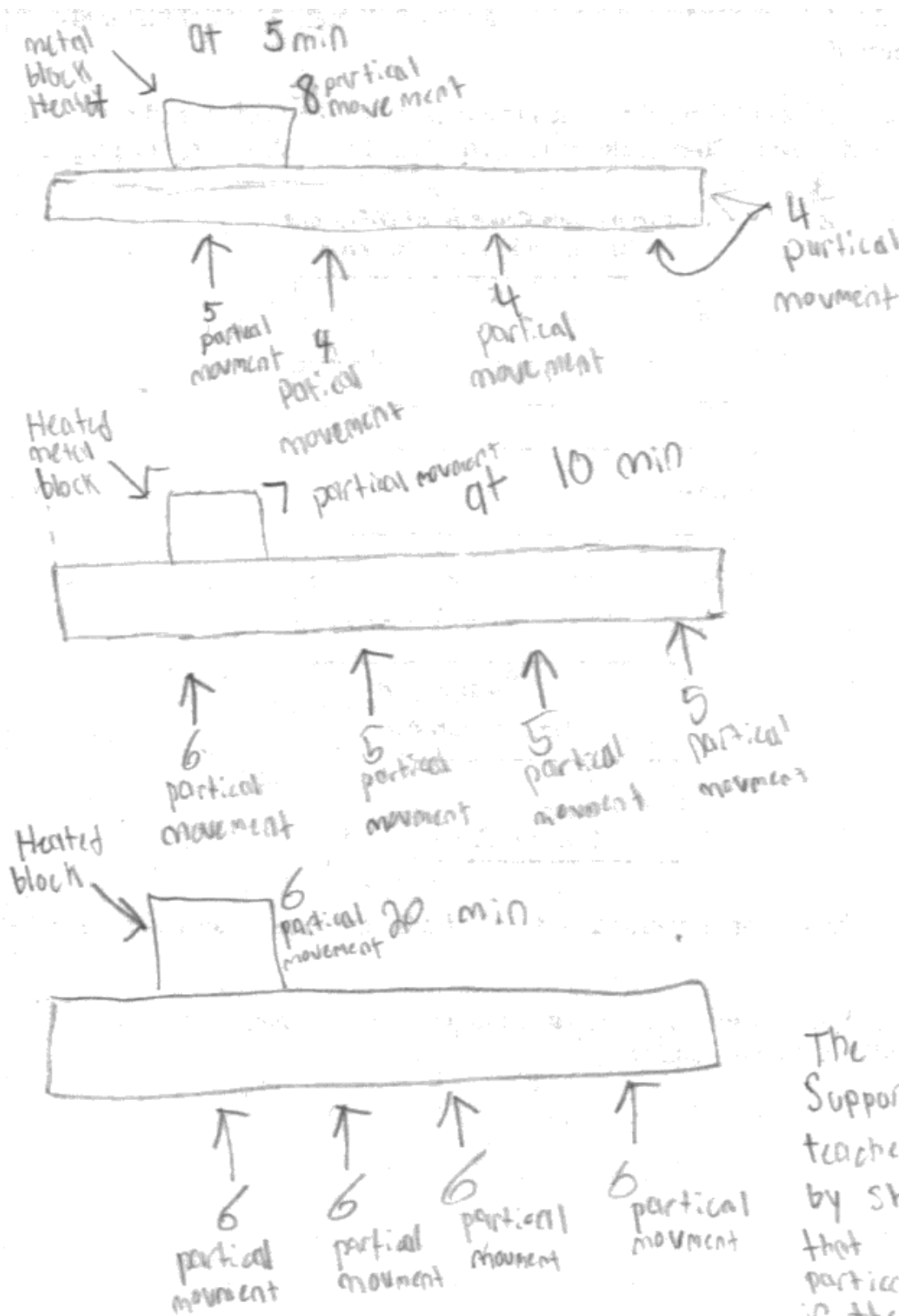


In this one they are moving fast but have not reached full potential.

20min

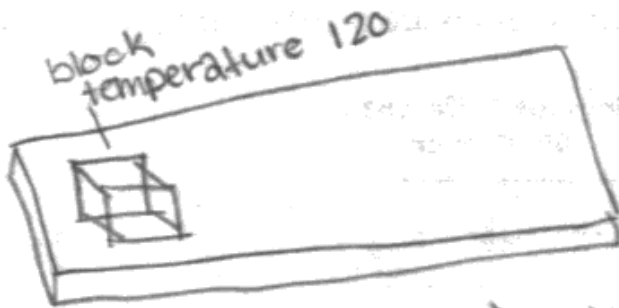


In this one they are moving fast and making the table hot while slowing the block down and cooling it off.



The model supports the teachers claim by showing that as the partial movement in the block decreased the movement in the table increased.

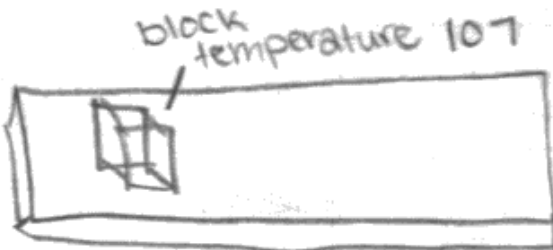
5 minutes



- Table temperature 70

After 5 minutes the block heats up the table to 70° and the block's temperature is 120° . This supports the teacher's claim because the temperature and the particles of the block are moving fast and are hot so has the kinetic energy. This is because the kinetic energy was transferring from the block to the table.

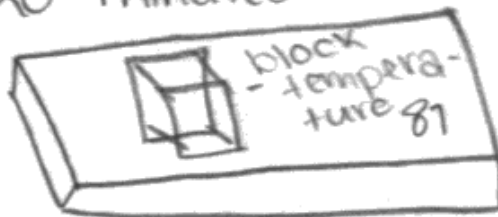
10 minutes



- Table temperature 79

After ten minutes the block's heat is 107° and the table's heat is 79° . So the block's temperature decreases and the table's temperature increases. This is because the kinetic energy is going from the heated box to the table.

20 minutes

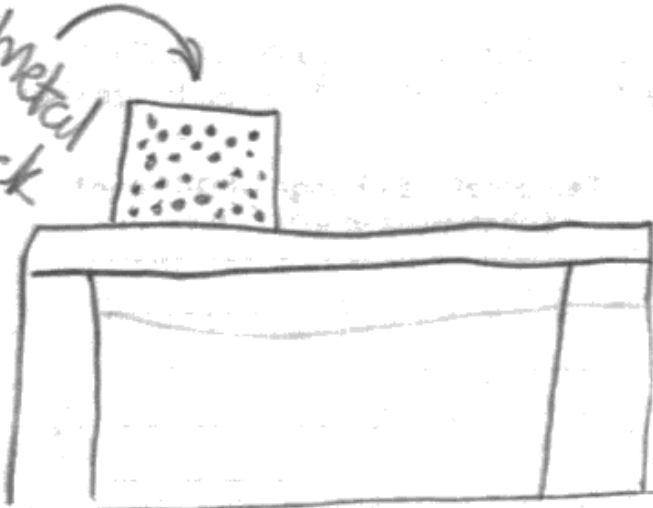


- Table temperature 87

After 20 minutes the box temperature is 87° and the table's temperature is 87° . The temperature are the same now because the longer the block stays on the table the more kinetic energy is transferred to the table which causes the block's particles to slow down and the table's particles to speed up.

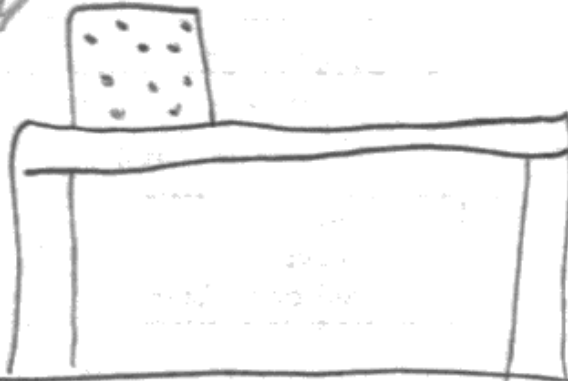
5 min

Metal Block



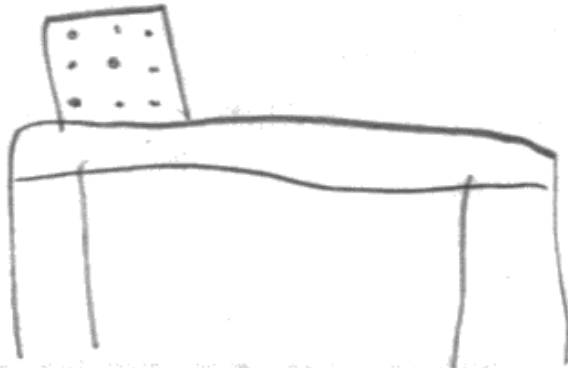
10 min

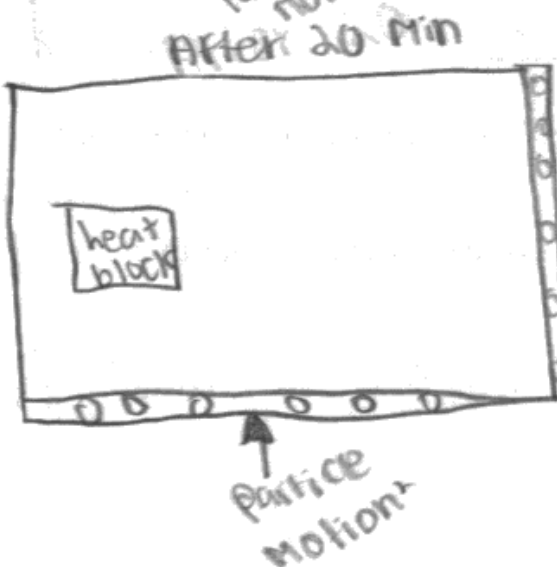
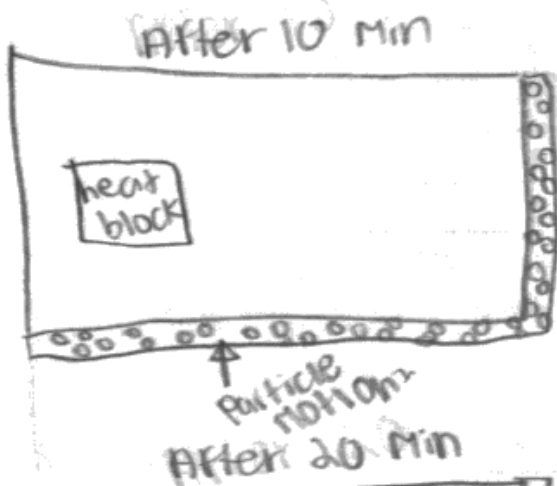
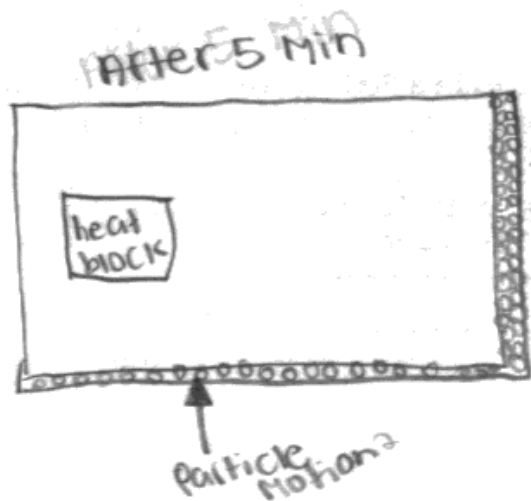
Metal Block



20 min

metal Block





The dots on the edge of this table represent the molecules. I am going to use the kinetic molecular theory to help explain this. As you can tell in the 5 minute block the "molecules" are close together, well that's because the energy from the heat block has not warmed up the molecules yet. As you see in the 10 minute block you see that the molecules are more spaced out, which means that the heat is starting to conduct and get the molecules moving. In the twenty minute block you can now see the molecules completely spaced out, because the heat block has completely heated up the table. The teacher stated that the energy went to Suzanna's hand because of kinetic energy. Well she's right, when

Suzanna's hand touches the table all of the heat molecules transfer to her hand because of conduction.

5 minutes
Heated metal block
↓ particle motion 6



↑ particle motion 7
↑ particle motion 2

20 minutes
Heated metal block
↓ particle motion 5.3



↑ particle motion 8.7
↑ particle motion 2.7

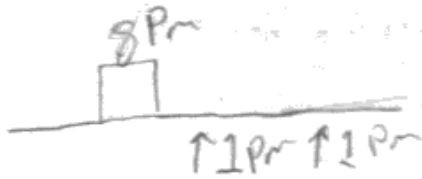
10 minutes
Heated metal block
↓ particle motion 5.7



↑ particle motion 7.9
↑ particle motion 2.5

This supports the teacher's claim because as the particle motion of the metal block decreased the particle motion of the table increased. This is due to the transferred of energy between the two items in order to eventually reach equilibrium.

5 min

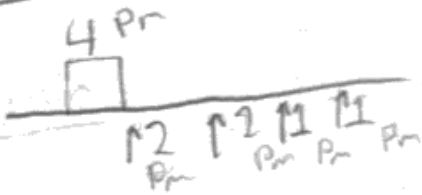


Pr = particle motion

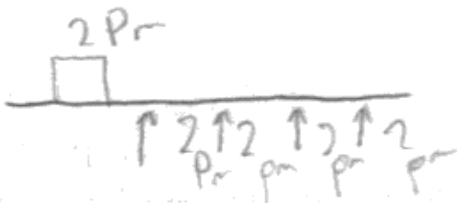
□ = Heated metal box

Key

10 min



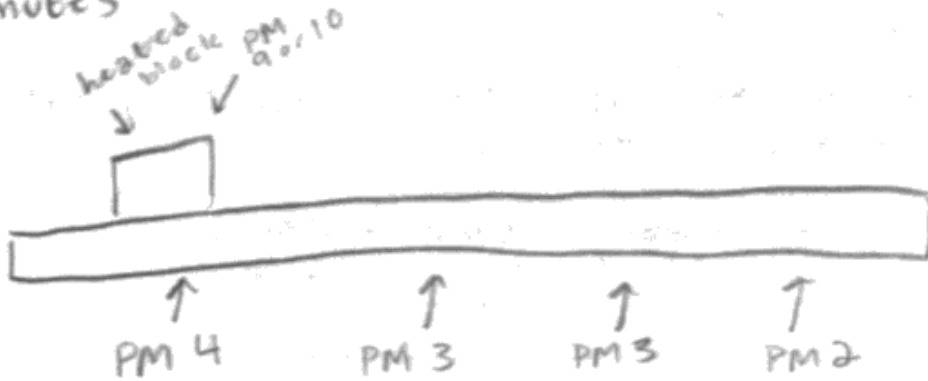
20 min



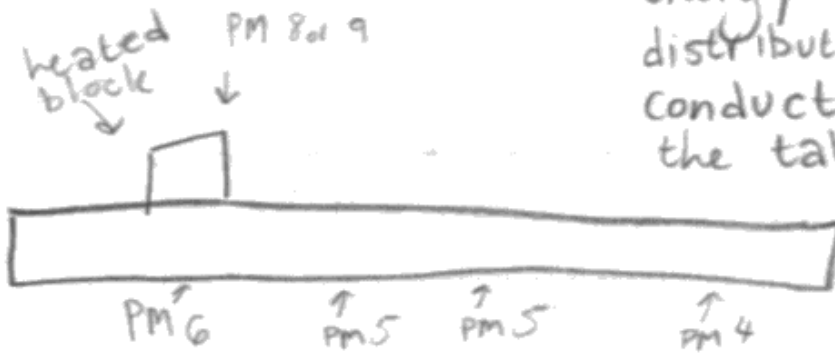
Explain-

These models support the teacher's claim by showing that over time the box begins to lose some particle motion as it spreads across the table - the blocks heat/particle motion is being spread evenly through out time across the table, and because of the movement in particles the heat is moved with it. The movement eventually spreads at over time along with the heat as it begins to run out.

① 5 minutes

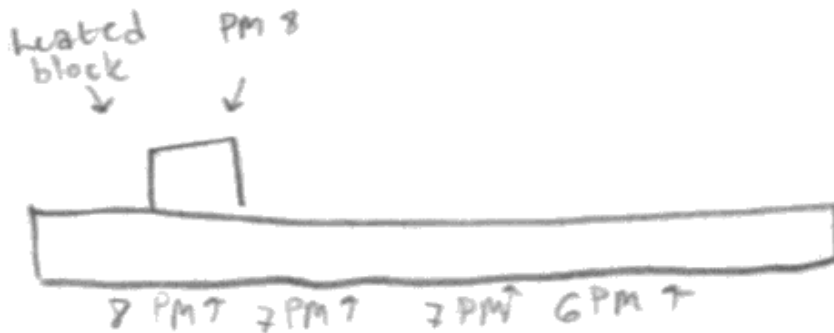


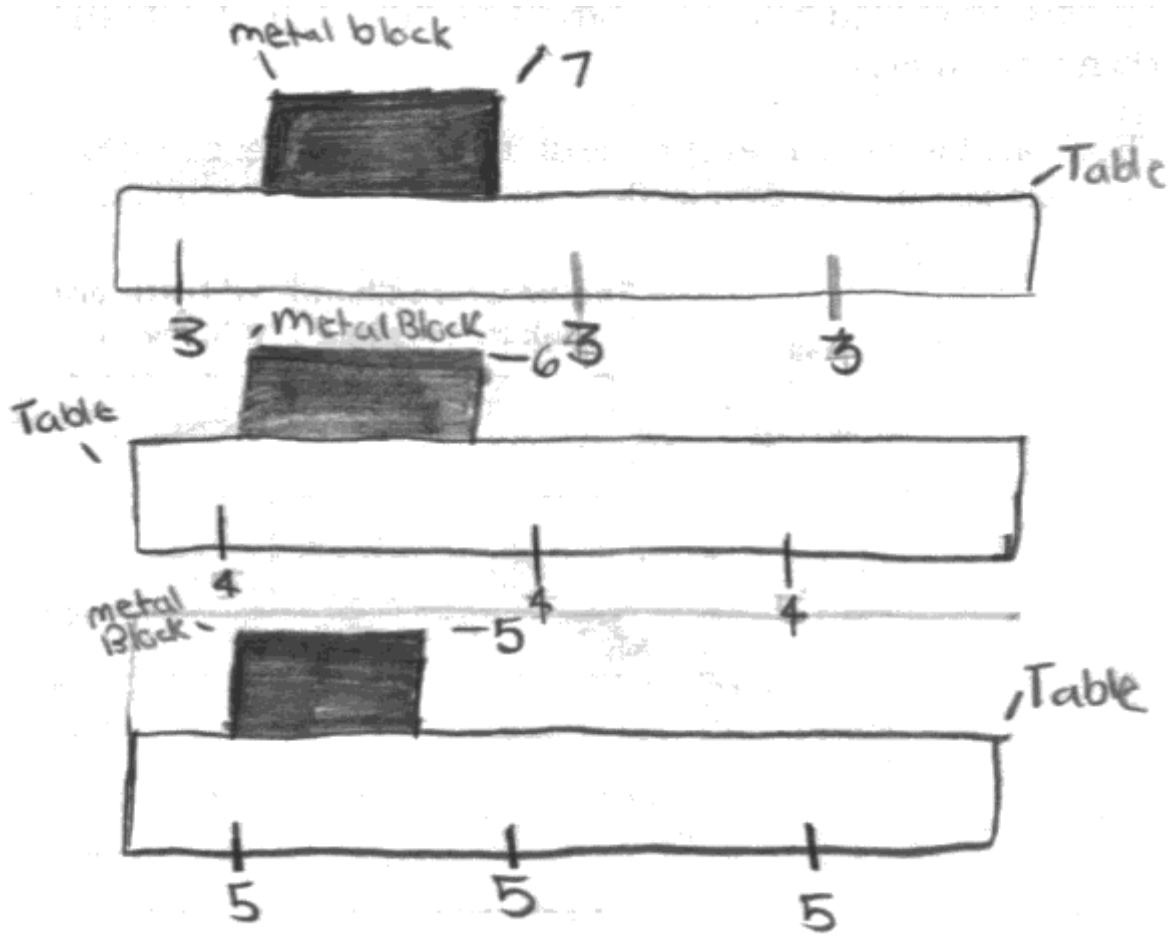
10 minutes



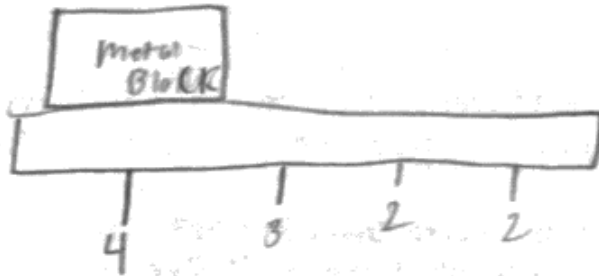
All of these models support the teachers' claim because the energy is being distributed through conduction across the table.

20 minutes

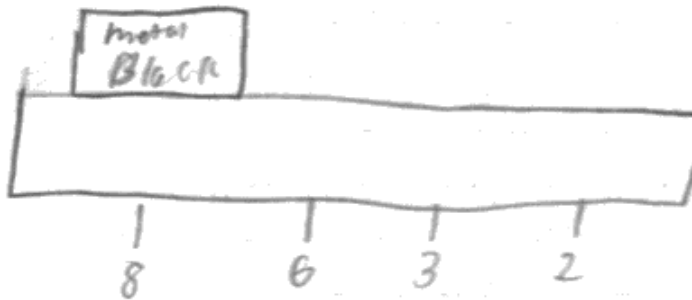




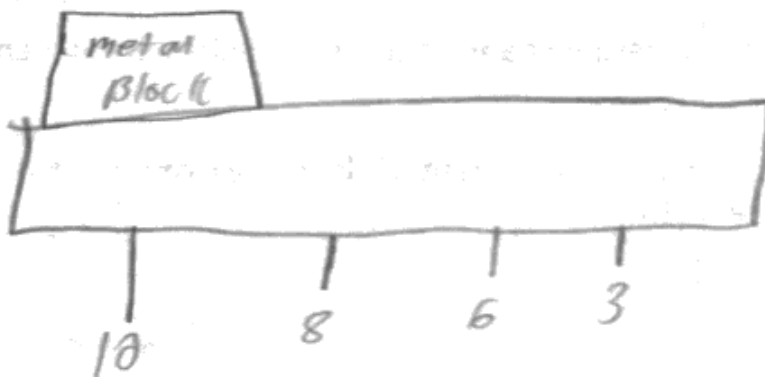
5 min.



10 min

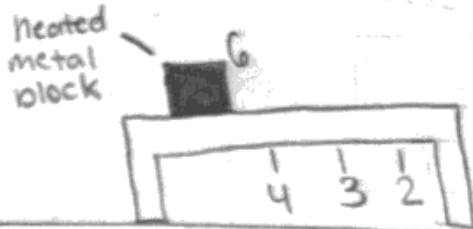


20 min.



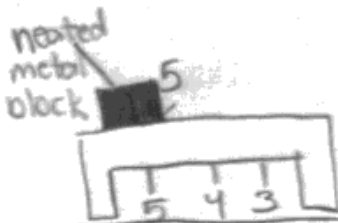
5 minutes

The energy from the block is slowly transferring to the particles in the table.



10 minutes

The energy from the particles in the block is being transferred to the particles underneath it in the table which then heat particles next to them in the table.



20 minutes

All of the particles in the block and table now have become equal in energy and will not transfer any more.

