Name _____

CALCULATING TIME OF DEATH USING ALGOR MORTIS

Objective: Estimate the time of death using algor mortis measurements

Procedure:
Working with a partner, answer the following questions using this information:

For the first 12 hours-the body loses 0.78 degrees C (1.4 degrees F) per hour.
After the first 12 hours-the body loses about 0.39 degrees C (0.7 degrees F) per hour

Example 1: What is the temperature loss for someonewho has been dead for twelve hours?
Temperature loss= (0.78 degrees C/hour) X 12 hours= 9.36 degrees C

Example 2: Calculate the time of death if a person has been dead for less than 12 hours.
If temperature loss is less than 12 hours (or less than 9.36 degrees C), then you use the rate of 0.78 degrees C per hour to estimate the time of death.

Temperature of dead body is 32.2 degrees C (90 degrees F)
Normal body temperature is 37 degrees C (98.6 degrees F)
37 degrees C – 32.2 degrees C= 4.8 degrees C lost since death

How long did it take to lose 4.8 degrees C?

0.78 (degrees C/hour) X (unknown number of hours) = degrees lost
0.78 (degrees C/hour) X (unknown number of hours)=4.8 degrees C lost by body

Solve for the unknown number of hours since death occurred:

Number of hours= 4.8 degrees C divided by 0.78 (degrees C/hour)
Number of hours= 6.1 hours
Convert 0.1 hours into minutes
0.1 hour (60 min/hour) = 6 minutes
Hours since death= 6.1 hours or 6 hours and 6 minutes

Example 3

Is the time of death more than 12 hours or less than 12 hours?
Recall that if a body has been dead 12 hours or less, it loses heat at the rate of 0.78 degrees C per hour. If the body has been dead 12 hours, then 78 degrees C/hour X 12 hours =9.36 degrees C

If a body loses more than 9.36 degrees C, then the person has been dead fro more than 12 hours
If a body loses less than 9.36 degrees C, then the person has been dead for less than 12 hours.

For each of the following, state if the body had been dead for more than or less than 12 hours based on the number of degrees lost:
1. total loss of 7.9 degrees C
2. total loss of 4.4 degrees C
3. total loss of 11.7 degrees C
4. total loss of 17.2 degrees C
5. total loss of 10.6 degrees C

Example 4 Calculate the time of death if the person was dead for more than 12 hours. If the body has lost more than 9.36 degrees C, then you know that the person has been dead for more than 12 hours. Recall that after 12 hours, the body loses heat at a rate of 0.39 degrees C per hour. You neeed to calculate how many hours beyond the 12 hours that someone died and add it to the 12 hours. Body temperature was given as 22.2 degrees C (72 degrees F)

1. How many total degrees were lost from the time of death until the body was found?
37 degrees C -22.2 degrees C= 14.8 degrees C
2. Since 14.8 degrees C is more than 9.36 degrees C, you know that the person was dead longer than 12 hours. How much longer?
37 degrees C-22.2 degrees C= total loss of 14.8 degrees C since death
9.36 degrees were lost in the first 12 hours
14.8 degrees C lost since death – 9.36 degrees C lost the first 12 hours = 5.44 degrees C lost after the first 12 hours
3. Recall that the rate of heat lost after 12 hours is 0.39 degrees C per hour. You need to determine how many hours it took to lose that 5.44 degrees C.

(0.39 degrees C/hour) X (unknown number of hours) = degrees lost after 12 hours
(0.39 degrees C/hour) X (unknown number of hours) = 5.44 degrees C lost after the inital 12 hours

Solve for the unknown number of hours

Unknown number of hours (x) = 5.44 degrees C divided by 0.39 degrees C/hr = 14.8 hours total time to lose 14.8 degrees C

4. First 12 hours there was a loss of 9.36 degrees C = 9.36 degrees C
Next 14.8 hours there was an additional loss of 5.44 degrees C = 5.44 degrees C
Therefore, the person has been dead about 26.8 hours or 26 hours and 48 minutes

Part A

1. Determine the approximate time of death using evidence from algor mortis. Show your work. Approximately how long has the victim been dead if his body temperature was 33.1°C?

2. A body found outside in the winter has a temperature of 33.1°C. Has the body been dead a longer or shorter time than in problem 1? Explain your answer.

3. Approximately how long has the victim been dead if his body temperature was 25.9°C?

4. What is the approximate time of death if the body temperature was 15.6°C?

5. What is the approximate time of death if the body temperature was 10°C?

6. What is the approximate time of death if the body temperature was 29.4°C?

7. What is the approximate time of death if the body temperature was 24°C?

Part B

Describe the impact on time of death for each of the variables listed. If you based your time of death estimates strictly on temperature loss to be 10 hours earlier, would you reduce your 10-hour estimate or increase your 10-hour estimate if the body had been:

1. Naked

2. Exposed to windy conditions

3. Suffering from an illness before death

4. Submerged in a lake