

Animal Enzymes & Cold – Student Activity

Catalysts called enzymes speed up most metabolic processes in living things. Enzyme activity is most efficient within a narrow range of:

1. Temperature
2. pH (acidity or alkalinity)
3. Concentration

Temperature

Core temperature in humans is usually maintained at about 37°C. Variation from this will cause enzyme dysfunction resulting in illness or death.

°C	Core Temperature	Result
50	43°C	Death
	42°C	Vomiting delirium
40	41°C	Fainting, vomiting, headache, confusion, panting, delirium
	40°C	Fainting, vomiting, headache, life threatening
30	39°C	Severe sweating, fast heart rate
	38°C	Hot, sweating, thirsty, onset of hyperthermia
20	37°C	Normal
	36°C	Moderate shivering
10	35°C	Blue skin, intense shivering, onset of hypothermia
	34°C	Severe shivering, loss of movement of fingers
0	33°C	Confusion, sleepiness, shivering stops
	32°C	Extreme sleepiness, delirium, medical emergency
-10	31°C	Comatose, shallow breathing
	30°C & less	Some people survive below 30°C for hours. Most do not.

Aim To demonstrate the effect of cold on the enzymes of a human

Materials per group or class

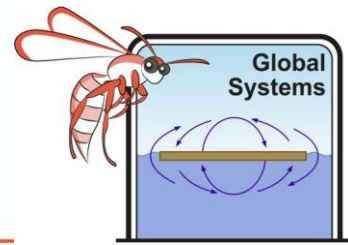
- Large buckets of cold water
- Ice cubes
- Scrap paper
- Ballpoint pens
- Towels or paper towels to dry hand
- A laboratory thermometer
- Scissors and sticky tape or glue



Method

1. Measure air temperature and add your observation to the table provided. (NOTE: remember to add units to the number!)
2. Add ice to the cold water and measure the temperature of the icy water. Add this observation to the table.
3. Each student quickly writes their signature on the scrap paper using their pen.
4. Students immerse their writing hand in icy water for two minutes
5. After 2 minutes rapidly remove hand from water, dry it and write your signature directly underneath the first example.

Animal Enzymes & Cold – Student Activity



Results/Observations

Air Temperature _____

Water temperature _____

Stick the paper with your two signatures onto the space below

Conclusion

Discussion

Was there an observable change in your signature? _____

What could have caused that change? _____

How could this experiment be improved? _____

EXTENSION

Why do most people in Australia suffer indigestion trying to eat a traditional English Christmas dinner in the middle of the day?
