1-1-2016

27.0.B Discussion Hot Cold Packs and Asimov Story

Christopher F. Bauer
University of New Hampshire, chris.bauer@unh.edu

Read the board for orientation instructions, then start Task 1 once you've got a full table.

Task 1: Inspect the consumer product or products at your table.

Test them out. Propose a suggestion for how they work. Useful information will likely be provided on the containers.

Each group will report on their product. Then the items can be passed around.

Task 2: Asimov's short story "The Last Question" (1 copy at table)

This the the last day, so appropriate to discuss "The Last Question"

In your groups, take 5 minutes to discuss this short story. In particular,

- What does it have to do with heat and energy?
- Other insights

Spokesperson will report out one thought or idea.

Demonstration and discussion to follow

Task 3: Lavoisier (1 copy at table)

In your groups take 5 minutes, list up to 5 things of significance he was responsible for, and why those things were important. What did he think heat was?

Task 4: Liquid Nitrogen Ice Cream (Dr. Chan) and Videos of things going boom

Task 5: Ask anything

Take 2 minutes at your table and decide on several questions you'd like to ask about anything (connections to class make sense, but anything is fair game as long we keep it ethical and legal).

Good watching:

http://www.pbs.org/wgbh/nova/transcripts/3501_zero.,html Nova: Absolute Zero

movie: March of the Penquins, 2005 Academy Award best documentary

Christopher F. Bauer, Principal Investigator.
This material is based upon work supported by the National Science Foundation under Grant No. 1245730.
Any opinions, finding and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

RECORDER REPORT, Chem 444A "Fire & Ice"

Group Member Name	Role	Date: 4/30/15
Nicholas Bauchard	Recorder	
Marissa	Manager	
Heather	Spokesperson	
Miriam	Reflector	

Task 1

1. Heat Pack

The contents are Sodium Acetate and water. When the contents mix (after "popping") an exothermic reaction occurs. This is why it feels warm heat is produced.

2. Cold Pack

The contents are ammonium nitrate and water. When the pack "pops" and the contents mix an endothermic reaction occurs and heat is absorbed making it feel cool.

Task 2.

The story kept referring to once the energy source which powers everything, such as the sun, burns out if it is possible to recreate a new energy source.

- The story also talked about the rebuilding of energy sources (stars) by capture "dissipated heat" "wasted" energy. There would have to be a way to collisions between
- It also talked about heat and ex new two stars can generate greater energy source.

- The story emphasized how when the energy is gone it's difficult to ascertain on answer where to recreate a new source.
- There isn't enough data to answer the question of creating a new "sun".

Questions:

Animal night vision... are they seeing heat? infrared?

RECORDER REPORT, Chem 444A "Fire & Ice"

Group Member Name	Role	Date: 4/30/15
Jon Tampos		
Andrew Cappetta		
Calé Frost		
Taylor Witkiewicz	Recorder	

---

① Cold Pack - endothermic chemical reaction (absorbing heat, now feels cold to touch)
- components in pack reacted when we burst the water pouch (water reacting with ammonium nitrate)
- phase change occured

② The Last Question:
- Can entropy be reversed?
- entropy is amount of disorder? energy disorder?
- energy conservation?
- energy still exists but it is not available
- entropy of universe is constantly increasing - we can keep finding energy sources but some energy is always being wasted (will eventually run out)

RECORDER REPORT, Chem 444A "Fire & Ice"

Group Member Name	Role	Date: 4/30/2015
Sean	spokesperson -	
Emily K		
Emily D		
Becky	recorder	

---

1) ice pack: endothermic reaction is taking place after the inner pouch is burst. When you activate the pouch the inner + outer contents combine to cause an endothermic reaction where heat is absorbed causing it to feel cold.

ammonium nitrate + water →

back/hand warmer: the handwarmer, when activated by the air is an exothermic Reaction. it is a slow ~~reactant~~ reaction, taking a long time to heat up. not sure of what the exact nature of reaction is, but we know it has something to do w/ being exposed to air.

2) Continuous story about trying to maintain a consistent energy source. Also about how to reverse the entropy of the universe. Entropy is the expenditure of energy. At the end of the story it seemed that the computer was God, and that there was no way to keep the energy source constant forever. The story was also very futuristic. after looking up further research on entropy we found that it is the energy in the universe that is Not being Used. Throughout the story, there was a lot of expression of the worry of running out of energy since the energy will, at some point, run out. We have enough energy but we don't use it

RECORDER REPORT, Chem 444A "Fire & Ice"

Group Member Name	Role	Date: 4/30
Samantha	recorder	
Jake		
Emma		
Tim		
Eliza		

(1) When water mixes with sodium acetate it produces an exothermic reaction, causing the heating pad to feel warm.

(2) Overall, we thought this was a very sad story because the computer had no answer for when the sun and other galaxy's suns ran out. It was all about just prolonging the issue, instead of trying to solve it. At the end, by the time they figured out how to reverse entropy, there were no humans. The main thing this got us thinking about was our own resources and how we may find ways to slow this process, but we will eventually run out of resources. So that realization was both startling and quite sad.

(3)
- He changed science from a qualitative to a quantitative one.
- He discovered the role of oxygen in combustion
- He named oxygen and hydrogen.
- He helped construct the metric system.
- He helped form chemical nomenclature
- He discovered the law of conservation.

RECORDER REPORT, Chem 444A "Fire & Ice"

Group Member Name	Role	Date: 30 April 2015
Amanda		
Kyle		
Kaleigh		
Mandy		

Ice pack:

We believe that once the water pouch is ruptured, the ammonium nitrate and water mixes and produces a chemical reaction that requires energy. This reaction is an endothermic process, which is why it feels cold

Task 2:

- Entropy will ~~be~~ go to a maximum one day, but we don't know exactly what will happen.

AC (the computer) knew everything, except what would happen in the end. It also addressed overpopulation on Earth and people living on other planets and in different galaxies

The question being asked everytime was if energy would ever run out and if they could manufacture energy once/if it ran out.

Christopher F. Bauer, Principal Investigator.
This material is based upon work supported by the National Science Foundation under Grant No. 1245730.
Any opinions, finding and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.