

P/O/E/T/S

CENTER FOR POWER OPTIMIZATION OF
ELECTRO-THERMAL SYSTEMS

Story Lining Chemical Reactions

ISTA 2019

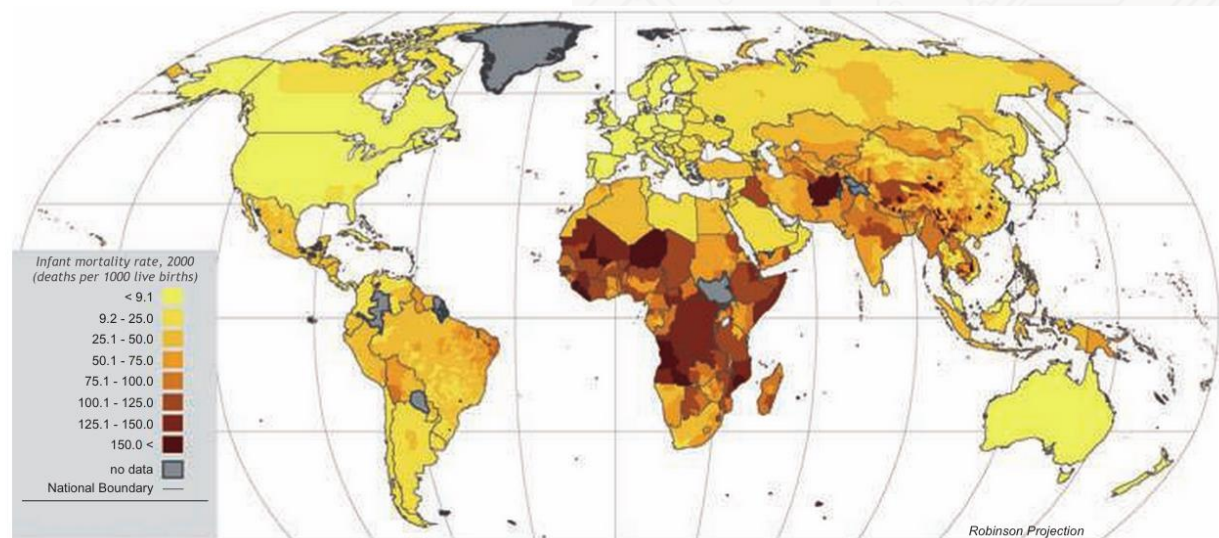
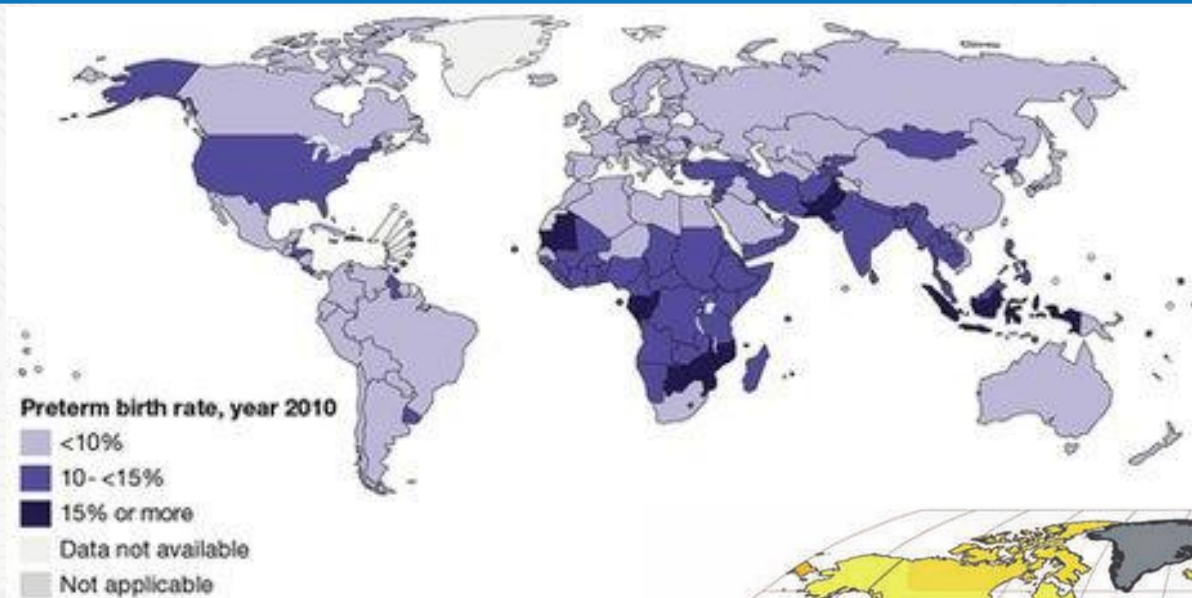
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UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN AN NSF SPONSORED CENTER



POETS

Analyze data

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The problem

- Premature infants need warmth of an incubator



The problem

- But more complex then just getting incubators





Overview of Unit

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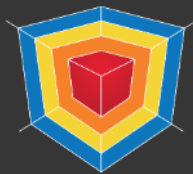


- Need to create heat
- Need to contain heat (Insulator)
- Need to regulate temperature (Phase change material)

Overview of Unit



- Need to create heat
 - Experiment on effectiveness of reactions
 - Modeling chemical reactions
 - Modeling what heat is
 - Create heating pack



POETS

Supplies – chemical reaction

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Inexpensive Version



Peroxide
(for hair)

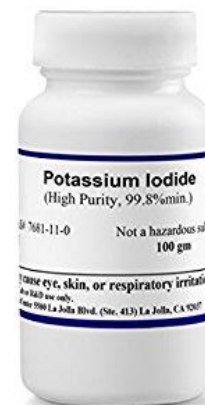


Yeast

Pure reactants



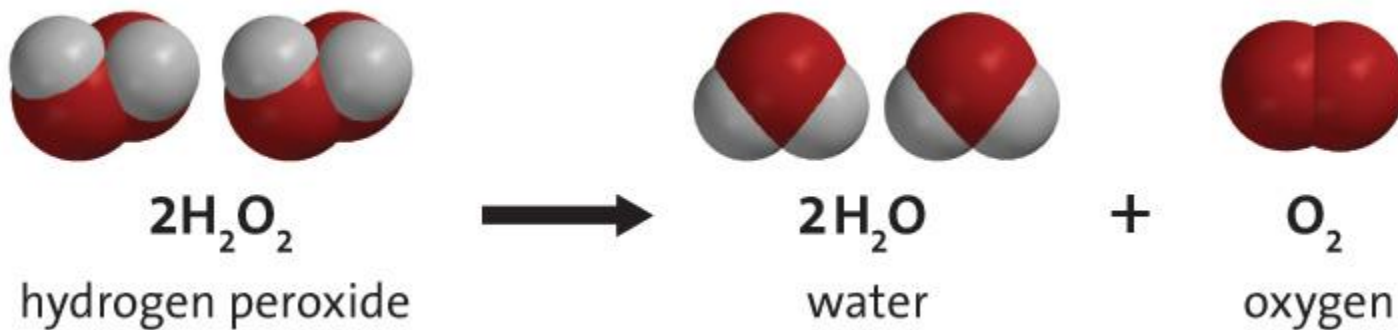
Hydrogen Peroxide



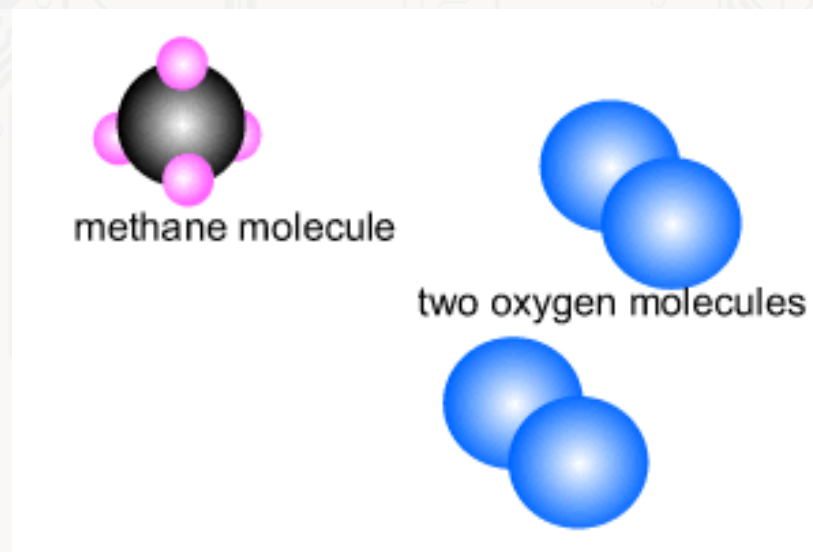
Potassium Iodide

The reaction

- Yeast or Potassium Iodide is a catalyst



- When molecular bonds break, often energy (as heat) is given off



Overview of Unit



- Need to create heat pack
- Need to contain heat (Make Insulator)
- Need to regulate temperature (Phase change material)

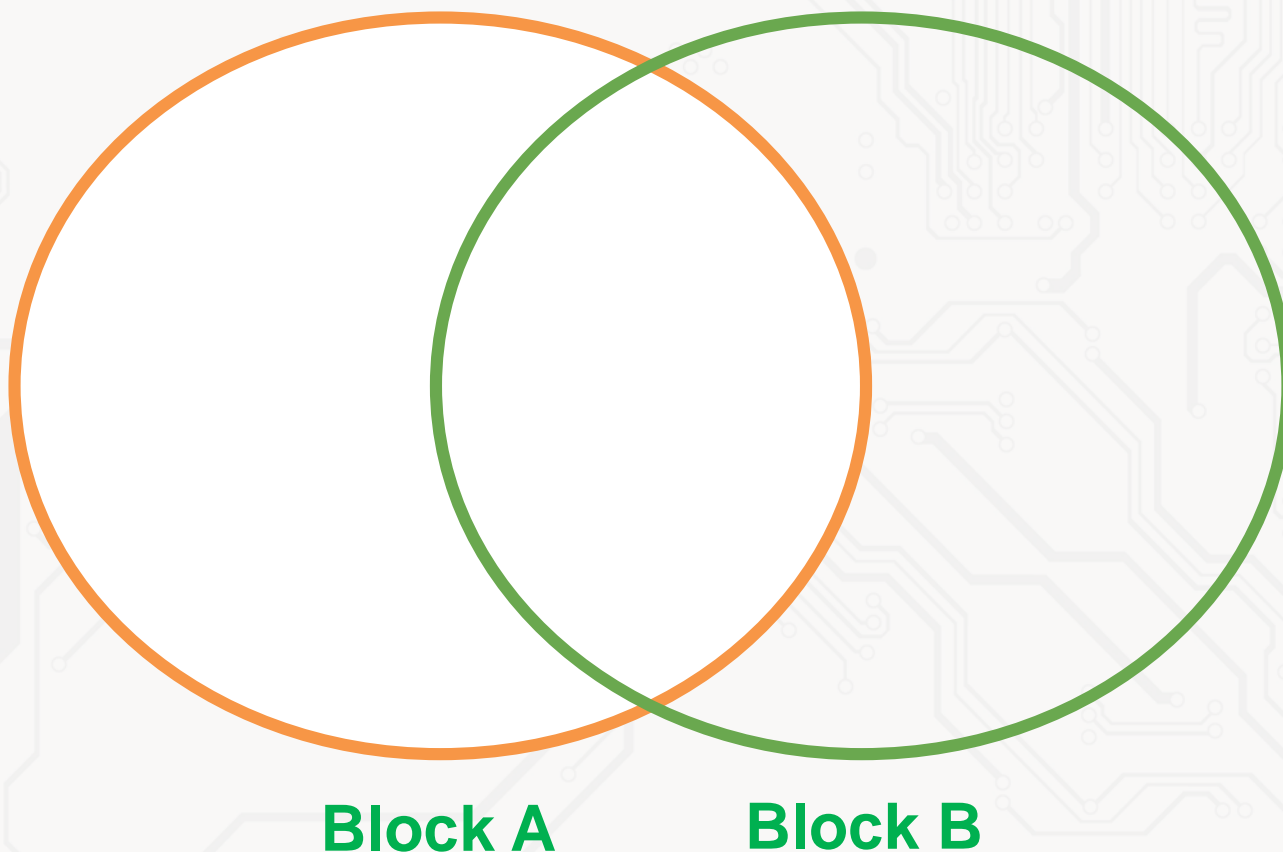
Overview of Unit



- Need to create heat
- Need to contain heat (Insulator)
 - Black blocks
 - Construct infant incubator

Black Blocks

Compare the two black blocks.



Building Material Price List

Pink Foam Board (20cm x 20cm)

\$15/piece

Cotton Balls - \$10 for 10

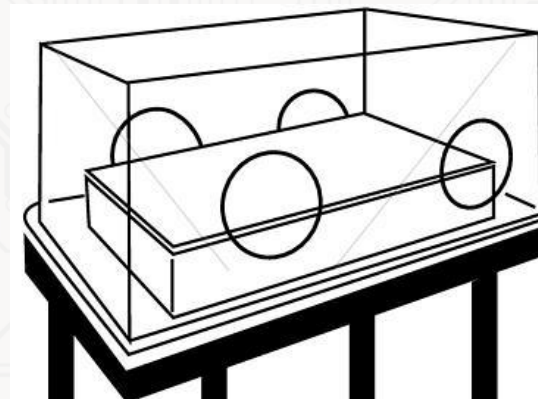
Green Foam (10cm x 10cm) \$25/piece

Aluminum foil (20cm x 20cm) \$10/piece

Plastic Wrap (20cm x 20cm) \$15/piece

Bubble Wrap (20cm x 20cm) \$20/piece

Plan



Task Sheet

Task to be completed

(Be specific! For example, use exact dimensions for cutting items)

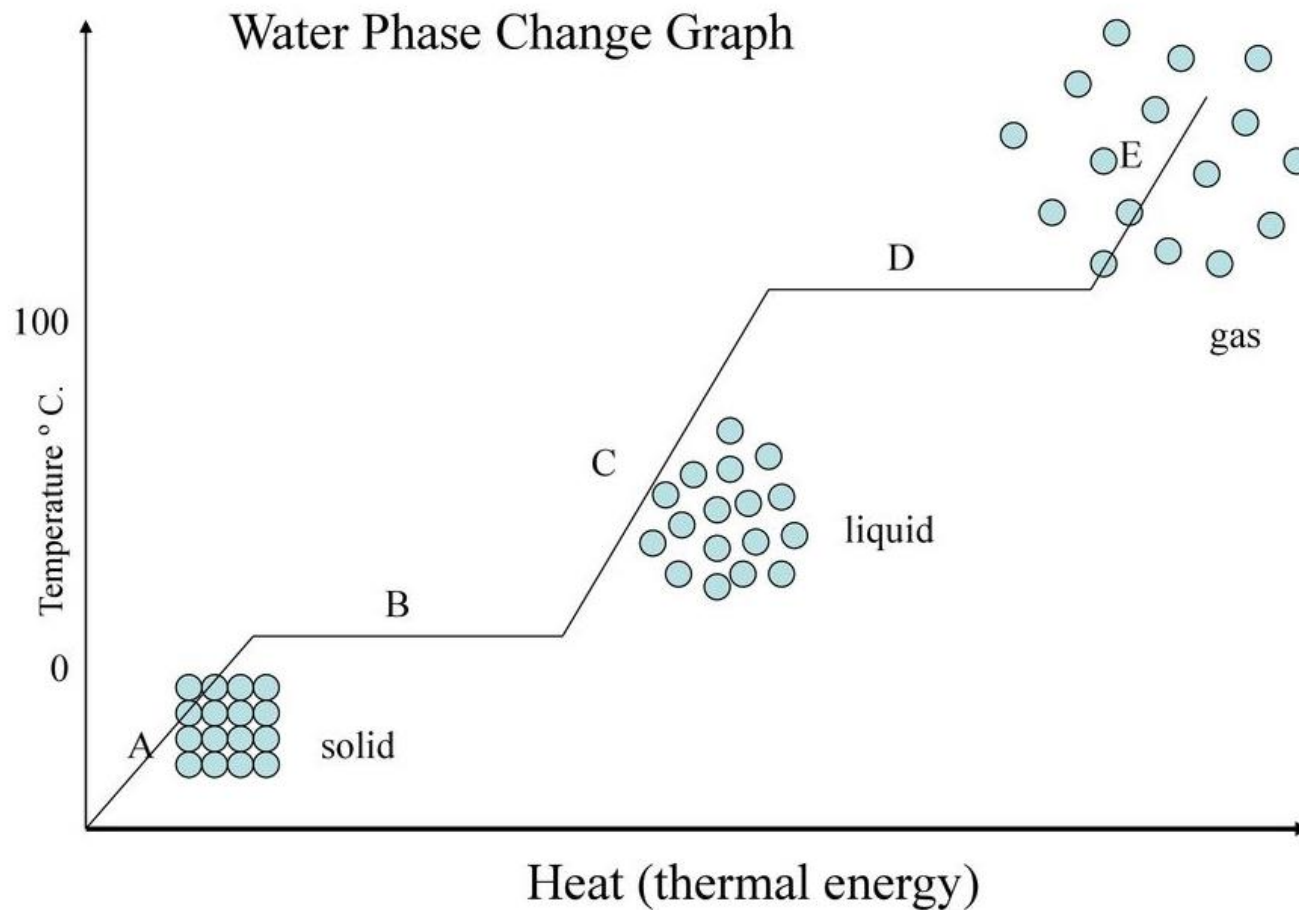
Person responsible for task

Overview of Unit

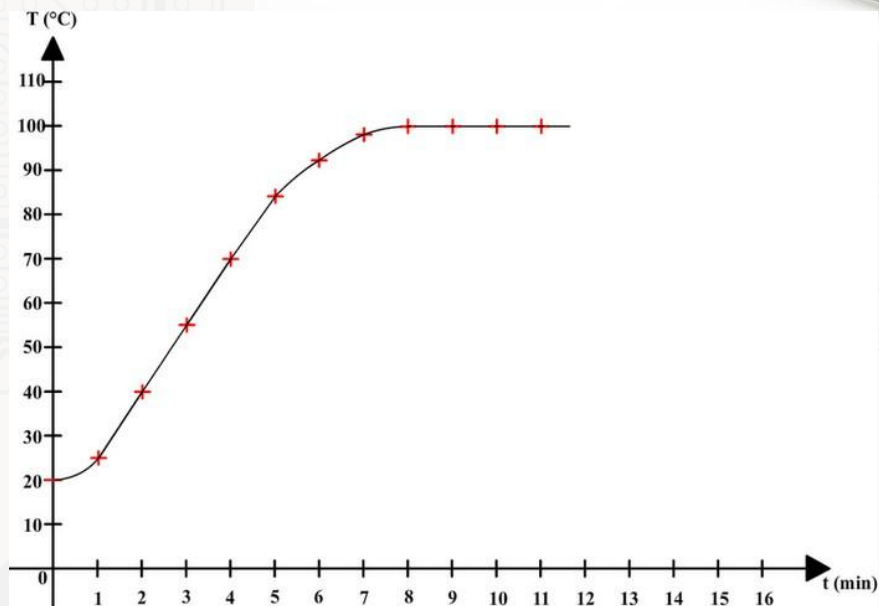


- Need to create heat pack
- Need to contain heat (Make Insulator)
- Need to regulate temperature (Phase change material)

Phase change



Chocolate Fondue



Petroleum Jelly

Changes phase
around body
temperature



Building Material Price List

Pink Foam Board (20cm x 20cm)

\$15/piece

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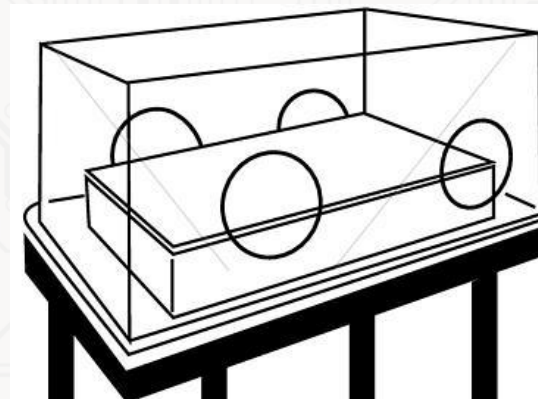
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Plan



Task Sheet

Task to be completed

(Be specific! For example, use exact dimensions for cutting items)

Person responsible for task

More information



Jill Wulff

wulffj@cusd305.org



Jennifer Smith

smije@sages.us



Jenny Brewer

brewerj@tuscola.k12.il.us



Joe Muskin

jmuskin@Illinois.edu

<https://poets-erc.org/infantincubator>