NCMN/Bright Lights
2014 Nanocamp
Monday
Tuesday
Basic Circuits

• What do you have to have for an Electrical Circuit?

1. Energy Source
2. Conducting path
3. Load (Resistance)
4. Switch (not needed, but usually present)
Let’s make circuits
LEDS
Happy Birthday, Dad! With you may the Force be.
Lemon Batteries
Wednesday
Thursday
“Making Stuff Smarter”
Shape Memory Material: Nitinol

- Revolutionary shape-memory materials: Nitinol
- An alloy of nickel and titanium, and see its amazing shape-memory properties.
- Can you think of an example of a such a material that we can use?
Applications of Smart Material

Solve problems in engineering, medicine, and everyday life
Metal Organic Frameworks: MOFs

Inorganic-Organic hybrid materials
Metal nodes are joined by organic linkers, giving an extended 3D cubic framework with inter-connected pores of 11.2 Å aperture width and 18.5 Å pore (yellow sphere) diameter.
Friday
Nanocamp June 20, 2013 Zane Gernhart

*Slides Courtesy of Chris Marin*
What is ice cream??

• It has ice in the name, is it a solid?
  – Not quite! See how it took the shape of

• Is it a liquid?
  – Not unless you wait too long!

• **It’s both!**
Colloids

- A colloid is one phase mixed into another.

<table>
<thead>
<tr>
<th>COLLOID SYSTEMS</th>
<th>Continuous Phase</th>
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<tbody>
<tr>
<td></td>
<td>Solid</td>
</tr>
<tr>
<td>Solid</td>
<td>Solid</td>
</tr>
<tr>
<td>Liquid</td>
<td>Gel</td>
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<tr>
<td>Gas</td>
<td>Solid foam</td>
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- Ice cream is both a foam, emulsion, and sol!