

### **Purpose**

Determine cost effective measures to reduce energy used by refrigerators on campus.

### **Materials**

Kill-A-Watt meter	Extension cord	Pencil
Digital thermometer	Infrared thermometer	Camera
Refrigerator Inspection Data chart on clipboard		

### **Procedure**

1. Draw a basic sketch of refrigerator in space provided on Inspection Data chart.  
  
Locate and use the information tags inside the refrigerator to identify the model # and age of refrigerator. Record information on data chart.
2. Inspect the interior of the refrigerator and freezer.  
  
Note the % of occupied space in each, and the existence/type of ice maker.
3. Inspect gasket seal. Document and photograph all areas with damage or excessive wear.
4. Use the IR thermometer to find areas of leakage – note locations on drawing that show significant temperature differences.
5. Place digital thermometer inside refrigerator and freezer. Leave inside for 3 minutes,  
  
Note and record reading immediately upon opening the doors.
6. Take off ventilation panel at the bottom (or back) of refrigerator to access the coils.  
  
Photograph and describe current condition of coils, including presence of dust.
7. Plug refrigerator into P3 Kill-A-Watt meter, then plug meter into the wall.
8. Check readings after one week and record **KWH used** and **Monitored Period** time.

### Refrigerator Inspection Data

Brand/model # \_\_\_\_\_

Ice maker type:   None                      Interior only                      Through the door

Refrigerator - % occupied \_\_\_\_\_      Freezer - % occupied \_\_\_\_\_

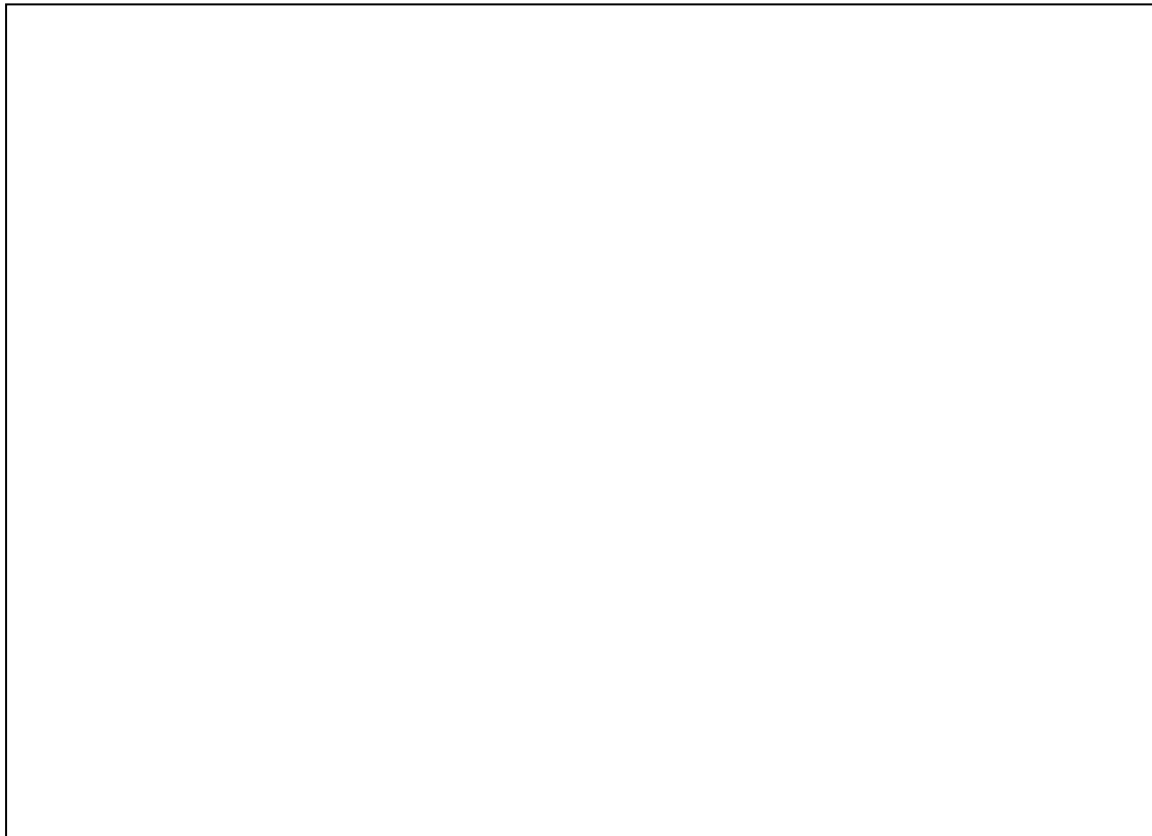
Refrigerator inside temperature setting/measured: \_\_\_\_\_/\_\_\_\_\_

Freezer inside temperature setting/measured: \_\_\_\_\_/\_\_\_\_\_

Describe condition of coils: \_\_\_\_\_

Meter readings: **KWH used:** \_\_\_\_\_      **Monitored Period: (hrs.)** \_\_\_\_\_

### Sketch of Refrigerator



### Calculations

Follow the steps below to calculate the average cost to operate the refrigerator for a year:

1. Divide **KWH used reading** by the number of hours the meter was running (**Monitored Period**) to determine average KWH.
2. Multiply the **average KWH** x **24 hrs** x **365 days** to get an average estimation of KWH usage for a year.
3. Multiply **KWH used per year** by the **electricity cost** charged by your utility provider.

### Example Calculations

<b>Model:</b> Non Energy Star rated refrigerator aged 15 years	<b>Calculate energy costs per year:</b>
<b>Monitored Period:</b> <u>48 hrs</u>	$4.4 \text{ KWH} / 48 \text{ hours} = 0.09167 \text{ KWH}$
<b>KWH used reading:</b> <u>4.4 KWH</u>	$0.09167 \text{ KWH} \times 24 \text{ hrs.} \times 365 \text{ days/yr} = 803 \text{ KWH/yr}$
<b>Electricity cost:</b> <u>\$0.1511/KWH</u>	$803 \text{ KWH/yr} \times \$0.1511/\text{KWH} = \$121.33$
	Total electricity costs to run this refrigerator for a year is \$121.33.

9. Calculate and record the average cost to run the refrigerator for 1 year: \_\_\_\_\_

10. Use the collected and calculated information to complete the [Refrigerator Retirement Savings Calculators](#) at the Energy Star website.

[http://www.energystar.gov/index.cfm?fuseaction=find\\_a\\_product.showProductGroup&pgw\\_code=RF](http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=RF)

11. Prepare a report that includes energy conservation measures, recommendations for repair or replacement, and a cost-savings analysis. Use these questions as guidelines:

***Does this refrigerator use significantly more energy than a newer Energy Star model?***

***Is it cooling to the correct temperature? Is it maintained properly and kept full most of***

***the time? Is it cost effective to replace it with a more energy efficient model?***