

Endothermic or Exothermic Device Exercise

SHARK Tank the project re: presentations. Bring in copies of print ads

INTRODUCTION

For this activity, you are living in a world where electricity is limited to the bare necessities. Electrical appliances and devices that we use today to keep things warm or cold are not allowed in the future world, because there is no electricity to support them. Ice is also in short supply.

As scientists in the future world, your job is to come up with a device that heats or cools *without* using electricity or ice. Because you are excellent chemists, you know that there are chemical reactions that absorb heat (thereby cooling their surroundings) and chemical reactions that release heat (thereby warming their surroundings). Your job is to use your knowledge of chemistry and endothermic and exothermic reactions to come up with a device that either heats or cools.

To be successful, you must do the following: (Unless noted, all these must be completed individually)

1. Name of Device
2. Describe the purpose of the device (Example: hand warmer)
3. Identify if your chemical reaction must be endothermic or exothermic in order to accomplish your goal.
4. Using the information you learned in your lab last week, select one reaction that you would use to "fuel" your device.
5. Design your device:
6. What will it be made of?
7. How will you keep the chemicals apart until it is time to use them?
8. Is your device reusable? If so, how will you refill the chemicals?
9. If your device is not reusable, are there any improvements you could make to it to make it so?
10. Draw and color a picture of your design. Label the important parts of it.
11. Draw a picture of your device in use.
12. Create an advertisement to sell your device, including the benefits of this device over its electrical counterparts, if it has one. Your advertisement may be in the form of one of the following:
 - A cartoon/Comic drawing
 - A letter to the editor
 - A song (group)
 - You may act out a commercial (group)

DUE _____

Name _____

Exothermic/Endothermic Device Worksheet (You can continue any answer on the back of page)

1. Name of Device _____

2. Purpose of Device _____

3. Is your Device Endothermic or Exothermic? WHY? _____

4. What materials will you use to for the reaction for your device? _____

5. Do these substances cause a strong or weak endothermic or exothermic reaction? Why do you want this type of reaction (strong/weak; endo/exo) in your device? _____

6. Did these chemicals prove to give reliable results in our lab? Is reliability something that will be important for you in your device? _____

7. Device Design:
Beside the chemicals in your device, what other materials will it be made of? _____

Why did you choose those materials? _____

8. Is your device Reusable/usable over a long period of time? _____

DUE _____

Name _____

9. If it is not reusable or cannot be used over a long period of time, why not? Are there problems with making it reusable? What might you be able to do to make it reusable/long-term use? _____

10.

Endothermic/Exothermic Reaction Device
Grading Rubric

Category	0-1 (failing)	2-3 (low-avg)	4 (avg-good)	5 (Excellent)	Total
Overall concept	Concept already exists/completely nonsensical	Concept shows little imagination/effort	Concept shows good imagination/understanding	Concept is very imaginative/innovative	
Worksheet	More than 80% incomplete	At least 20% complete, but most answers are incomplete sentences	Worksheet is complete and answers are sufficient	Worksheet is complete and answers reflect care and effort	
Device Design Drawing	No effort/not in color.	Some effort. Color may or may not have been used. No scale provided	Drawing is complete and in color.	Drawing is complete, in color, important parts labeled; scale is included.	
Device in Use Drawing	No effort/not in color.	Some effort. Color may or may not have been used. Drawing does not clearly show use.	Drawing is complete and in color. Use of device can be determined by drawing.	Drawing is complete, in color, and clearly shows how the device is used.	
Advertisement	No effort shown.	Ad is incomplete or is complete but of poor quality.	Ad shows effort to explain device	Ad exceeds requirements and shows effort and planning	
Behavior in Group (as determined by group members)	This will be based on a student review	This will be based on a student review	This will be based on a student review	This will be based on a student review	
GRAND TOTAL					