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Insulator Design Challenge Worksheet

Your task is to design and build an insulator with a paper cup and other materials to prevent your ice cube from melting and keep your water colder than the other groups in your class!

Introduction and Design	
1.	Which stops or prevents heat from being transferred? Circle one: Conductor OR Insulator
2.	What do you need to do to prevent the ice from melting and keep your water colder? **Word Bank** heat outside inside energy melt cold **My Answer:** To stop the ice from melting and to keep the water cold, we need _____ _____ _____.
3.	How will we measure which group's insulator is the most successful? **Word Bank** temperature thermometer hot cold melt least **My Answer:** We will know which group has the best insulator by _____ _____ _____.
4.	What materials will your group use to build your paper cup insulator? **My Answer:** To build our paper cup insulator, our group will use _____ _____ _____.

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5.	**Draw a diagram to plan your paper cup insulator below**. Label the materials and the direction of the heat flow.
6.	Why did you design your insulator like this, and with these materials? Explain. **My Answer:** We designed our insulator like this because _____ _____ _____ _____ _____ _____ _____ _____ _____ _____.

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Testing

Trial 1:

Initial water temperature (°F): _____ Final water temperature (°F): _____

Time passed: _____ At this time, how much of your ice cube is left? _____(g)

Trial 2:

Initial water temperature (°F): _____ Final water temperature (°F): _____

Time passed: _____ At this time, how much of your ice cube is left? _____(g)

Troubleshooting and Redesign Notes

After testing our insulator, one problem that we found is _____

_____

_____

_____

_____

_____

_____.

To try to solve this problem, we changed _____

_____

_____

_____

_____

_____.

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Challenge Results

My group members: _____

Time passed: _____ At this time, how much of your ice cube is left? _____(g)

Initial water temperature (°F): _____ Final water temperature (°F): _____

Materials used: _____

_____

Members of one other group: _____

Time passed: _____ At this time, how much of your ice cube is left? _____(g)

Initial water temperature (°F): _____ Final water temperature (°F): _____

Materials used: _____

_____

Conclusion

How did the **winning group** keep their ice cube frozen and water colder the longest?

Word Bank

conductor	insulator	heat	materials	outside	inside	transfer

The winning group's insulator was built with _____

_____

_____.

My group's insulator was different because _____

_____

_____.

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Reflection

Answer three of the five following questions to guide you in writing a reflection about your experience during this engineering project.

1. If we had more time, **how would you continue to change** or test your insulator?
2. **How was your experience** doing engineering in this project?
3. What did you **like** and/or what did you **dislike**?
4. What is **something you learned about engineering or yourself** in this project?
5. How was it **working with your lab partner** on this project?

Sentence starters:

1. If we had more time we would …
2. My experience doing this project was…
3. What I liked and disliked was …
4. One thing I learned about engineering was …
5. Working with my lab partner was …

My Answer: _____