



You are Hereby Challenged...

You are hereby challenged to create an insulating device that will keep hot water warm for the longest time (compared to your classmates). In class, on the due date, we will add $\frac{1}{2}$ cup of very hot water to your device and measure the temperature change over the class period.

Whoever designs and builds the device that loses the least thermal energy, WINS!!!

Insulating Device Design Constraints

Do:

- Use anything you have at home to make your device - there is no need to buy anything
- Make your device able to stand on its own on a desk (no holding it with your hands to keep it up)
- Make your device able to hold about $\frac{1}{2}$ cup of water without any leaking or spilling
- Make your device structurally secure so it doesn't fall apart, (strong enough to be used in the "real world" is even better)
- Review the rubric on the back to understand how you will receive your grade

Do Not:

- Make your device larger than a shoebox
- Use a thermos or a travel mug (or any other pre-made insulating device) in any way
- Build a device that seals completely (this becomes a pressure issue)
- Add a heat source to your device — no hand-warmers or candles!
- Hand in something that wasn't *made by you* (handing in a coffee mug doesn't cut it)

Insulating Device Design Challenge Rubric

CATEGORY	4	3	2	1
Insulating Ability	Device functions exceptionally well, loses less than 10° C in 30 minutes	Device functions well, loses less than 20° C in 30 minutes	Device is not an effective insulator, loses less than 30° C in 30 minutes	Device is not appropriately designed to be an insulator in any way
Structure Design	Device is able to stand freely on a desk, does not spill water, does not seal	(Intentionally blank)	Device has a leak, or does not stand well alone on a desk	Device does not hold water, does not stand on its own at all, seals shut, or is larger than a shoebox
Construction	Superior construction, could hold up to “real world” use; device looks neat and clean	Good construction, sturdy and well made; device looks neat and clean	Construction reflects “not a best effort”	Construction prevents even testing the device or is very messy

Total Earned Points _____ / 12