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| **1st period** |
| **Group** | **Summary** | **Items Mentioned** | **Comments** | **Grade** |
| 1 | * Error with thermometer
* Didn’t record the highest temp because didn’t wait long enough.
* Made ΔT too low.
* Made C too low.
* C = 0.338
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Correct that not waiting long enough makes ΔT too low.
* Change to C incorrect - If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 6/10 |
| 2 | * Didn’t stir water well
* Hot spots in cup
* ΔT too low
* No C value reported from presenter (C=0.5908)
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** NO | * Good identifying sources of error
* No mention of how C was changed.
* C value not correctly calculated in notebook by presenter
 | 3/10 |
| 3 | * Didn’t boil brass long enough
* Used too much water in cup
* Didn’t stir water in cup
* C = 0.238
 | **Source of Error –** Yes**Variables Changed –** NO**Direction Variables are Changed –** NO**Directional Impact on C –** NO | * Good listing many sources of error
* No mention of how the variables were actually changed. Simply saying they *were* changed is not enough.
 | 3/10 |
| 4 | * Trial one was faulty
* Thermometer broke
* Had to wait for new thermometer
* While waiting water cooled down
* Tf was too low
* ΔT therefore to low
* Too low of C
* C = 0.304
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Correct that ΔT too low.
* Change to C incorrect - If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 6/10 |
| 5 | * ΔT wrong – brass not on hot plate long enough
* Holes in cup let heat out
* ΔT and Q changed
* C = 0.609
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** NO**Directional Impact on C –** NO | * Correct that ΔT and Q are changed
* Correct that ΔT too low seemed to be the source of error – too small ΔT does make C too large BUT you did not mention that ΔT was too low and C was therefore too large!
* No mention of how that would change variables or specific heat
 | 3/10 |
| 6 | * Brass not in boiling water long enough.
* Didn’t wait long enough in the cup
* ΔT therefore too low
* C therefore too low
* C = 0.348
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Correct that not waiting long enough makes ΔT too low.
* Change to C incorrect - If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 6/10 |
| 7 | * Measured mass of water wrong
* m therefore too high
* therefore Q is changed
* C = 0.293
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** NO | * Correct that m and Q would be changed
* Good in that m being too high would make C too small – so that supports your result BUT you didn’t explain that!
* No mention of how that would change specific heat
 | 5/10 |
| 8 | * Loss of water due to transferring
* m too low
* C too low
* C = 0.359
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Correct that m would be too small BUT if m is too low then C is too HIGH C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 6/10 |

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| **2nd period** |
| **Group** | **Summary** | **Items Mentioned** | **Comments** | **Grade** |
| 1 | * Took too long transferring from boiling water to cup
* ΔT too small
* Changed Q
* C = 0.332
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** NO | * Correct that not waiting long enough makes ΔT too low.
* Change to C not mentioned
* Incorrect source of error- If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 3/10 |
| 2 | * Boiling water temperature was not up to 100C
* Q affected
* ΔT too small
* C too high
* C = 0.395
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Perfect! If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 10/10 |
| 3 | * Brass left for too short of a time
* ΔT too low
* C too low
* C was not done correctly in presenter’s notebook. Other group member reported C = 0.453
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Good listing many sources of error
* Change to C incorrect - If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
* You reported C was too low but your C was too high!
 | 3/10 |
| 4 | * Beaker to cup transition too slow
* Brass cooled down during transfer
* ΔT too low
* Q too low
* C too low
* C = 0.37
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Correct that too long of a transfer makes ΔT too low.
* Change to C incorrect - If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 6/10 |
| 5 | * Beaker to cup transition too slow
* Brass cooled down during transfer
* ΔT too low
* Q too low
* C too low
* C = 0.287
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Correct that too long of a transfer makes ΔT too low.
* Change to C incorrect - If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 6/10 |
| 6 | * Didn’t leave brass in water long enough
* ΔT too low
* Q too low
* C too low
* C = 0.249
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Correct that not leaving brass in water long enough makes ΔT too low
* Change to C incorrect - If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 6/10 |
| 7 | * Boiling water was not at 100C
* Affected Tf
* MadeΔT too low
* C too low
* C = 0.327
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Correct that water not being at 100C would make ΔT too low
* Change to C incorrect - If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
 | 6/10 |
| 8 | * Brass not in water long enough.
* ΔT too low
* C too low
* Brass hollow – too much mass due to water
* m too high
* Q too low
* C too low
 | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes | * Correct that brass not being in water long enough makes ΔT too low
* Change to C incorrect - If ΔT is too low then C ends up too BIG. C = Q/(mΔT) 🡪 Dividing by a too small number makes your C too large.
* Correct that mass too high makes C too low
 | 7/10 |

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| **3rd period** |
| **Group** | **Summary** | **Items Mentioned** | **Comments** | **Grade** |
| 1 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** NO |  |  |
| 2 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 3 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 4 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 5 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 6 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 7 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 8 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |

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| **4th period** |
| **Group** | **Summary** | **Items Mentioned** | **Comments** | **Grade** |
| 1 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** NO |  |  |
| 2 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 3 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 4 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 5 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 6 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 7 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |
| 8 |  | **Source of Error –** Yes**Variables Changed –** Yes**Direction Variables are Changed –** Yes**Directional Impact on C –** Yes |  |  |