

Teachers Maglev*(Maglev, quantum levitation, superconductors, locking)*

Day 1	p-values	pre/mid	mid/post	pre/post
	content	0.0001***	0.2921	0.0011***
	confidence	0.0001***	0.826	0.0001***

N=25	Pre		Mid		Post	
7 questions	Content	Confiden.	Content	Confiden.	Content	Confiden.
Average	3.52	2.34	5.04	3.92	4.76	3.85
Std Dev	1.50	0.89	0.89	0.99	0.97	0.93

Students

Day 1	p-values	pre/post
	content	0.0025***
	confidence	0.0001***

N=32	Pre		Post	
5 questions	Content	Confiden.	Content	Confiden.
Average	2.5	2.12	3.22	3.84
Std Dev	0.98	0.79	0.83	0.55

Teachers Atomic*(spectroscopy, energy levels, states, quantum numbers, Bohr)*

Day 2	p-values	pre/mid	mid/post	pre/post
	content	0.0005***	0.5374	0.0011***
	confidence	0.0008***	0.3073	0.0001***

N=25	Pre		Mid		Post	
7 questions	Content	Confiden.	Content	Confiden.	Content	Confiden.
Average	4.32	2.57	5.79	3.73	5.58	4.01
Std Dev	1.46	1.17	1.30	1.11	1.08	0.78

Students

Day 2	p-values	pre/post
	content	0.0324**
	confidence	0.0001***

N=29	Pre		Post	
5 questions	Content	Confiden.	Content	Confiden.
Average	1.59	1.52	2.24	2.77241379
Std Dev	1.05	0.63	1.21	0.79

Teachers: Technology*(Quantum gates, QKD, polarization, measurements)*

Day 3	p-values	pre/mid	mid/post	pre/post
	content	0.0007***	1.00	0.0011***
	confidence	0.0006***	0.1644	0.0001***

N=23	Pre		Mid		Post	
5 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	3.13	2.33	4.43	3.75	4.43	4.19
Std Dev	1.55	1.35	0.73	1.26	0.89	0.80

Students

Day 3	p-values	pre/post
	content	0.0001***
	confidence	0.0001***

N=27	Pre		Post	
4 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	1.37	1.75	3.26	3.48
Std Dev	0.97	0.83	0.86	0.89

Teachers Laser Cooling*(momentum, energy, Doppler)*

Day 4	p-values	pre/mid	mid/post	pre/post
	content	0.0026***	1	0.0022***
	confidence	0.0001***	0.418	0.0001***

N=22	Pre		Mid		Post	
6 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	1.92	2.77	3.54	3.95	3.77	3.95
Std Dev	1.00	1.41	1.00	1.00	0.86	0.95

Students

Technology glitch, did not get data

2024 Data Summary

Day 1: Particles

(Quarks, Higgs, Atomic model, CERN, antimatter)

Teachers

Day 1	p-values	pre/mid	mid/post	pre/post
	content	0.1977	0.0018**	0.0006***
	confidence	0.0001***	0.1702	0.0001***

N=25	Pre		Mid		Post	
6 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	3.84	2.01	4.28	3.53	5.16	3.87
Std Dev	1.46	1.33	0.84	0.92	1.03	0.80

STUDENT

Day 1	p-values	pre/post
	content	0.0075**
	confidence	0.0001***

N=35	Pre		Post	
5 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	2.09	1.15	2.91	2.50
Std Dev	1.095	0.81	1.38	1.21

Day 2 Radioactivity

(radiation/decay, Herschel, Feynman, flame tests)

Teachers

Day 2	p-values	pre/mid	mid/post	pre/post
	content	0.0020*	0.7927	0.0104*
	confidence	0.0001***	0.2592	0.0001***

N=27	Pre		Mid		Post	
7 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	5.33	2.59	6.33	4.10	6.26	4.36
Std Dev	1.36	1.05	0.83	0.95	1.19	0.74

Students

Day 2	p-values	pre/post
	content	0.001**
	confidence	0.0001***

N=37	Pre		Post	
6 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	2.92	1.88	4.00	3.19
Std Dev	1.38	1.14	1.33	1.09

Day 3 BBPP

(Blackbody Radiation, Bohr, Photoelectric, Planck)

2024 Data Summary

Teachers

Day 3	p-values	pre/mid	mid/post	pre/post
	content	0.0582	0.6573	0.0229*
	confidence	0.0001***	0.1658	0.0001***

N=27	Pre		Mid		Post	
7 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	5.44	2.63	6.00	3.97	6.11	4.26
Std Dev	1.1875	1.2633	0.9199	0.8229	0.8916	0.6871

Students

Day 3	p-values	pre/post
	content	0.0657 (not quite)
	confidence	0.0008***

N=31	Pre		Post	
6 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	2.19	2.02	2.81	2.91
Std Dev	1.33	0.92	1.28	1.06

Day 4 Heisenberg

(Polarization/Superposition, Golden Rules, Heisenberg, LIGO, double slit)

Teachers

Day 4	p-values	pre/mid	mid/post	pre/post
	content	0.0147*	0.7524	0.0410*
	confidence	0.0001***	0.7436	0.0001***

N=27	Pre		Mid		Post	
7 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	3.8889	2.5123	4.7037	4.1358	4.5926	4.2099
Std Dev	1.1209	1.1218	1.2346	0.8334	1.3376	0.8225

Students

Day 4	p-values	pre/post
	content	0.0001***
	confidence	0.0001***

N=37	Pre		Post	
5 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	1.41	1.75	2.59	3.11
Std Dev	0.98	1.014	1.14	1.11

Day 1: Wave Particle Duality*(Superposition, Interference, Interferometer, Mach Zehnder, LIGO)***Teachers**

Day 1 WPD	p-values	pre/mid	mid/post	pre/post
	content	0.0013**	0.3648	0.0002***
	confidence	0.0033**	0.7119	0.0090**

N=18	Pre		Mid		Post	
7 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	3.89	2.48	5.33	3.65	5.67	3.54
Std Dev	1.37	1.33	1.08	0.84	1.14	0.93

Students

Day 1 WPD	p-values	pre/post
	content	0.8524
	confidence	0.0273*

N=21	Pre		Post	
6 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	2.24	1.48	2.43	3.21
Std Dev	1.37	0.99	1.21	0.88

Day 2: Malus' Law*(Malus' Law, Cryptography, Polarization)***Teachers**

Day 2	p-values	pre/mid	mid/post	pre/post
	content	0.0027**	0.4795	0.0009***
	confidence	0.0213*	0.1302	0.0007***

N= 20	Pre		Mid		Post	
7 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	4.75	2.86	6.10	3.71	6.3	4.16
Std Dev	1.68	1.28	0.85	0.93	0.92	0.91

Students

Day 2	p-values	pre/post
	content	0.0005***
	confidence	0.0001***

N=24	Pre		Post	
6 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	2.58	1.71	4.04	3.39

2025 Data Summary

Std Dev	1.21	1.27	1.46	1.00
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Day 3 HUBPPQ

(Blackbody, Herschel, UV Catastrophe Photoelectric, Planck, Quantization)

Teachers

Day 3	p-values	pre/mid	mid/post	pre/post
	content	0.1377	0.2246	0.0059**
	confidence	0.0001***	0.5093	0.0001***

N=19	Pre		Mid		Post	
7 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	4.19	2.16	4.81	3.80	5.24	3.98
Std Dev	1.36	1.28	1.29	0.93	0.94	0.82

Students

Day 3	p-values	pre/post
	content	0.1293
	confidence	0.0075**

N=19	Pre		Post	
6 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	2.89	1.96	3.58	3.06
Std Dev	1.59	1.26	1.07	1.13

Day 4 Heisenberg, Atomic

(Heisenberg, Probability, Bohr, Quantum dots)

Teachers

Day 4	p-values	pre/mid	mid/post	pre/post
	content	0.0409*	0.0468*	0.9976
	confidence	0.0035**	0.3147	0.0006***

N=21	Pre		Mid		Post	
7 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	5.58	2.73	4.68	3.83	5.58	4.10
Std Dev	1.02	1.34	1.53	0.75	1.12	0.88

Students

Day 4	p-values	pre/post
	content	0.0013**
	confidence	0.0001***

2025 Data Summary

N=19	Pre		Post	
6 questions	<i>Content</i>	<i>Confiden.</i>	<i>Content</i>	<i>Confiden.</i>
Average	2.53	1.01	4.13	3.41
Std Dev	1.25	1.17	1.55	1.20