

D1.5-05 | Introductory Physics Students' Mathematical Preparedness and Conceptual Understanding of Force

Presenting Author | *Dakota King, Arizona State University*

Additional Author | *David Meltzer E, Arizona State University*

Over the past four years, we have administered over 6,000 mathematics diagnostics to introductory physics students at four large state universities. Previously, our hand-written diagnostic only included pure mathematics problems in graphing, trigonometry, geometry, and algebra. While these problems have shed light on the severity and nature of students' mathematical difficulties, our new online diagnostic aims to also measure performance on conceptual physics problems (Newton's second and third laws). We find the mathematics portion of our online diagnostic shares the same characteristics as older hand-written versions with similar correct-response rates, internal consistency, and performance predictability. Our analyses show that overall mathematics performance is correlated with performance on the newly added physics problems ($r=0.35$). Here, we present our most recent findings while examining the observed relationship between math and physics performance.

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