Dear President Biden,

On behalf of the more than xxx undersigned individuals and organizations, we write to express our support for the elevation of data science education. We encourage states and school districts to incorporate data science into math standards and curriculum, and we believe that the federal government can play a key role in supporting such reform.

The reason is simple. Data science is becoming central to the modern world. Data science has experienced 650% job growth since 2012 and recent job reports show that 7 out of the 10 fastest growing careers are data centric. Whether they are entering newer roles such as data scientist and machine learning engineer or working in newly data-transformed roles in sales development, software development, and customer success manager, today's workers need data skills to compete and succeed.

Data fluency is also necessary for everyday life, as Americans work to successfully consume information and advocate within their communities. From evaluating data used to justify claims in news reports to weighing the risks and benefit of personal choices, interpreting and manipulating data is now central to even the most commonplace activities.

Despite this shift, few school districts have updated their standards, courses or curriculum to ensure that all students graduate high school with even a basic command over data. With algebra, geometry, and calculus packing the curriculum sequence, only 10 percent of high school students take a statistics course. Practically no districts take advantage of opportunities to modernize the curriculum by integrating data into subject areas such as social studies or humanities. And even in natural opportunities, most statistics courses are heavily theoretical, and too many science applications are shallow or superficial.

The following "Data Science for All" executive actions would elevate the importance of data science, encourage more states, districts and schools to integrate data science into required high school curriculum, and help students acquire the skills and understandings they need to thrive in the future. Students would also become familiar with key issues around responsible data science including issues of equity, ethics, privacy, and fairness.

We recommend four actions:


1. **Campaign around "Data Science for All."**

*Why:* Demand for data scientists continues to soar. Similar to President Obama's 100Kin10 initiative, which seeks to fill the shortages of STEM teachers, a new administration could begin a campaign to increase awareness on the need for data science in schools.

*How:* A federal campaign to promote "Data Science for All" would include a "commitments" conference. The commitments within the conference would vary but might include high schools promising to offer courses in the subject, districts promising to support teacher professional

development, and colleges and universities promising to modify policies to allow data science experiences to satisfy college admissions requirements in mathematics.

The federal campaign would also elevate some of the key courses and resources available in the space. The goal would be for all high school students to have taken at least one data science course before graduation.

**When:** A new administration could announce the campaign within the first 100 days of the term as part of a larger push for technology and innovation.

2. **Collect information on data science offerings**

**Why:** Data science is not only a prerequisite for STEM fields but also an important skill to participate in the community given the overwhelming prevalence of data in many aspects of society. While studies show that there is inequitable access to rigorous math and science courses in high school, there is little information about access to courses that integrate or focus on data fluency.

**How:** The US Department of Education collects data on access to high school advanced math and science courses as part of the Civil Rights Data Collection. Currently, schools report if they offer Algebra I & II, Geometry, Advanced Mathematics, Calculus, Biology, Chemistry, and Physics. While data science could count as "advanced mathematics," the Administration could request reporting access to data science courses, specifically. Additionally, data science or data science integration could be added to the subject matter codes on the National Teacher and Principal Survey Teacher Questionnaire.

**When:** The Administration could make the change in the first few months of their term in order to ensure that it is included in the next Civil Rights Data Collection survey in the 2021-2022 school year and other upcoming national surveys.

3. **Release a letter or fact sheet with opportunities to use federal funds to boost data science instruction**

**Why:** There is significant flexibility in Title I funds and opportunities to blend funding streams across other federal programs to improve student outcomes. In 2013, the Department of Education sent a letter to state directors to remind state educational agencies of this leeway. The Department provided specific examples of how to blend funding streams. Still, few states and districts take advantage of these opportunities, and, continue to use federal funds in a similar way year after year.

*How:* Similar to the letter that the Department sent in 2013 and the fact sheets they released following the ARRA investment, the Department could release a document describing opportunities to use Title I dollars and other federal programs to refine math standards and curriculum in order to integrate data science skills. The Secretary or an Assistant Secretary could also do a tour of the states and districts that are already using the funds in these ways to further highlight key ideas.

*When:* The Department could release a letter at any time.


### 4. Establish "Data Science For All" Ambassadors

*Why:* Demand for data scientists and computer scientists is rising year on year. High-profile and early opportunities for data and computer scientists to use their skills are likely to attract talent to education. While many entities can create these opportunities, the Department of Education has a unique draw given its access to data and program management.

*How:* Similar to the School Ambassador Fellowship, a new administration could establish a "Data Science For All" Ambassador. The fellowship would invite top computer science or data science talent to work at the US Department of Education for one to two years in various offices – Office of Innovation, Institute of Education Sciences, Office for Civil Rights etc.

The fellowship would leverage talent in the field to support the Department of Education, including by sharing best practices or innovative approaches to incorporate into grant programs or running innovative data analyses, and entice more of these professionals to focus on education.

Additionally, the Einstein Fellows program brings educators into the national education arena for year-long experiences. Placing an explicit emphasis on encouraging Fellows with an interest in data science education at the K-12 level would send a national message and inject meaningful opportunities to emphasize the importance of this field across federal agencies.

*When:* A new administration could announce the new fellowship opportunities in the first few months of its term. The recruitment and application process would likely take 9 to 12 months, so related fellows would begin in the fall of 2021.


### 5. Launch a National Research Council workshop on K-12 Data Science Education

*Why:* There is significantly less research on the essential components of mathematics learning than the essential components of literacy instruction. A recent white paper commissioned by the National Academies of Sciences, Engineering, and Medicine (NASEM) reviewed research on students' data use in grades 6-12 and identified that many questions remain about the

foundational skills students need to become proficient in analyzing and interpreting data and the kinds of instructional approaches —including use of technology—that are most effective.

**How:** A new administration could bring visibility to the need for data science education at the K-12 level by convening a public workshop on the *Foundations of Data Science for Students in Grades K-12* through the Board on Science Education. While research on math instruction is still years behind reading instruction -- and research on data science even more so, such a workshop would help translate available research and create a baseline understanding for the education field. It would also serve as a jumping off point for future research to refine effective interventions for data science learning, shape the development of instructional materials, and gain greater understanding on learning difficulties related to mathematics and data science.

**When:** A new administration could launch this workshop in the first month of its term and the report could be completed in 6-12 months.

Thank you for the opportunity to consider this letter.  Please contact Ulrich Boser at at ulrich@the-learning-agency.com or Chad Dorsey at cdorsey@concord.org with any questions.

Sincerely,