

Remarks by the Honorable Ray Mabus
Secretary of the Navy
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I want to thank everybody here for coming to talk about STEM education, Science, Technology, Engineering and Math, and how we can improve that education and how we can improve our investments in it. I am really grateful for everybody's work on this amazingly important subject. I've been getting reports on speeches before now and I'm looking forward to what people after me have to say. I'm really interested to see what best practices we can pick up in terms of STEM and I think that we're going to have a lot of exciting work to do over the next five years in STEM education in the Navy.

Before I get started on STEM though, I do want to say a couple words about Admiral Carr. I've had the opportunity to work with him now since I've been Secretary for the last two years, and there is nobody who is more passionate, nobody who is more focused, nobody who has the laser-like attention to our education system and particularly to STEM. He is dedicated to this program, he genuinely believes in what he is doing and we've got the right person leading the STEM effort and naval research for the Navy. Thank you, Admiral Carr.

Now, I know you've heard from Cliff Stanley, from Dr. Vest and from Admiral Carr about the so called "gathering storm" in this country and the current state of STEM education and STEM research. I just want to highlight a couple of pretty striking facts and talk about their impact on the Navy and the Marine Corps in particular.

We have about 3 million students that graduate from high school every year, and out of those, only about a third start college in a STEM field. And out of those, about half will graduate and very few go on to advanced study in the same subjects. To put it another way, for every 50

high school diplomas, we get four Bachelors degrees and one advanced degree in STEM subjects.

And that's just not enough, that's nowhere near enough. As a society, as a nation, we can't be satisfied with those sort of numbers. In December, a report was issued that said we had fallen to the bottom of developed nations in world education ratings, specifically in science and math, and our educational system was rated average.

The United States of American should never accept being average in anything, particularly in education.

In this country, we still have the best universities doing the best research, and I've met with a lot of them over the past two years to talk about STEM. But I have to tell you, our edge is slipping. The failing of too many elementary and secondary schools and the lack of high-quality, early childhood education means that fewer and fewer students get to those great universities and get into those programs, particularly in graduate school and particularly in the areas like science and math, engineering and technology. And of those that do - in these great universities - fewer and fewer are American. More and more of those students are from places like India and China and they're going to take that knowledge back to fuel their economies to incentivize their research labs and not ours.

Now, that's a problem for this country and it's a problem for the United States Navy and the United States Marine Corps, because we need US citizens, we need US scientists and we need US engineers in our naval labs and in our research facilities. And more than that, we need incredibly skilled and incredibly competent Sailors and Marines who have been prepared well enough through high school to do the increasingly complex tasks they are called upon to do every single day in the increasingly technical Navy and Marine Corps.

In the fleet and in our operating services, Sailors and Marines are called upon every day to do a lot of really, really difficult things. They work on the world's most complicated and best anti-air and anti-missile systems. They maintain avionics systems and they hang ordnance on aircraft heading out for combat missions. They operate nuclear power plants on our subs and our carriers. Those are just a few of the things they do. Every single one of these tasks, as well as the literally hundreds and hundreds of other technically challenging missions that our people perform every day doesn't just take intelligence, although that's critical, but it takes those critical thinking skills that you get from a great education. It is more clear now than it's ever been before, that our nation's security depends on our smarts as well as our strength. And in fact, we become strong only if we're smart.

So the quality of our education system matters a lot, and it is why current statistics are just so troubling. This one ought to bother you more than any: three out of four Americans, three out of four 18 to 24 years old do not qualify to join the United States military. Three out of four. They don't qualify for educational reasons, they don't qualify because they have a criminal record, or they don't qualify for health reasons, mainly obesity.

That statistic, three out of four, three out of four 18 to 24 year olds not fit for military service, who do not qualify, has to concern us as a county. It has to concern us about the future, both for our military and for our country as well. There are a lot of causes for it, a lot of factors you can point to, but one thing is clear: we as a society are not adequately preparing our children for adulthood. They are not getting the appropriate life skills and they are not getting the tools they are going to need to be in a global, fast-changing and ever more complex world.

It is not because our students and our 18-24 year olds are not capable. All you have to do is hang around with a 3 year old for just a little while and see the incredible sponge of knowledge

and the curiosity and the desire to learn. And somehow, we manage to take that enthusiasm, that thirst for knowledge, and just beat it out of them, just make them incurious, make them willing to settle for less.

And I absolutely believe that we get what we expect. If we expect every student and every child in America to do well, that's what they're going to do. Very frankly right now, we don't. Every one of you sitting here today, think about the kids you know, whether they're in elementary school or high school and you say every one of those kids, every single one of them, can do this. There's not one that can't. There's not a person in here that's thinking in the back of their mind, that's true, except for so-and-so, I don't think he can do it, I don't think she can do it. We get what we expect. We've have to expect more. We've got to demand more. This is a great interest for the Navy and Marine Corps, but it is of crucial interest to the United States. It's an area that the President has talked over and over about. It's an area that we should all be grateful for his leadership and his vision.

And I think, in our corner, the Navy and Marine Corps, that we are beginning to do better, that the Naval STEM efforts that are underway around the country as part of our education system will help meet those expectations, will help create that high bar that we ought to expect all students to clear, will help improve not only the Navy and Marine Corps, but the United States in science and engineering, in technology and mathematics, in the things that we're going to have to compete as a country more and more in the future. I'm really proud of STEM, I'm really proud of Navy STEM, things like our internships, STEM 2 Stern program, Iridescent, Young Innovators and Sea Perch.

I've had a lot of great days since I became Secretary. I get to do some of the coolest things on earth. One of the very best things I got to do was I got to go last fall with Admiral Carr

to the Bronx and open a Science and Technology Center for the Iridescent program in a low income section of the Bronx where you see can see the Manhattan skyline. That was a cold and rainy December day, but it was one of the most rewarding I've had in this job because we literally had a couple hundred kids there and to see the excitement, to see the wonder at these hands-on things they were getting to do, I have to tell you, they didn't care one thing about hearing the speech. They didn't care if it was Admiral Carr or me, they didn't care if it was the congressman or the representative from the mayor's office because they wanted to be with those experiments, they wanted to be doing the science experiments that were laid out for them, they wanted to be learning about this stuff.

And that's exactly the way it ought to be. They ought to be excited about science and math. They ought to be encouraged to study those subjects instead of saying, that's too hard or I can't do that. Yes, you can do that. They ought to be encouraged not only to study, but to think about a future that involves a lot of science, a lot of engineering, a lot of math and a lot of technology. And I said that in my speech.

I've got three daughters. I've got one that's going to be 21 years old next month, one that's 19 and one that's 10; two of them are in college. And I have watched them as they've grown up and watched how excited they would get because of a good teacher, because of a good program and things like science, things like math, chemistry and biology. I watched how, by no fault of my own as an English major, how they would delve into these things because somebody said, you ought to look at this because this is fun and this is exciting. And I've gone out with them at midnight looking for star constellations because they had to get a certain number in a week. I went the other direction, because they had a science teacher, all three of them, same school in Mississippi, that insisted they each find 30 fossils. Now, if someone tells you to go

out and find 30 fossils, you're going to say, you're nuts. What am I going to do, break into a museum or something? Let me tell you something, on the gravel road that leads to our house, every one of them found 30 fossils. They're there, we just don't pay attention to them. Those three children that I have are very representative.

Their grandfather, my father, was a civil engineer and loved the precision of science and mathematics. It skipped a generation. But I don't know how much of that skipping a generation was me, or how much of it was that just nobody expected it. I went to school in a town with a thousand people in North Mississippi; we didn't have a science lab and we didn't have a single foreign language taught in that school. Now when my father had gone to that school and graduated in 1918, he had taken Latin and French and Spanish and Physics and Chemistry. By the time I got there, we had none of those. What happened?

I think we're turning that around now. We certainly have for my three children, but I'm one of the really fortunate people in this country and so are my children. They're fortunate to go to great schools. They're fortunate to have teachers who are paid a lot and have highly skilled and enthusiastic backgrounds in their subjects. Every child in America deserves that, not just my children.

And that's why going to New York was just so exciting because those students that were there, those middle schoolers, faced a whole lot of challenges. That congressional district is the poorest district in the country. It abuts the richest district in the country. It doesn't matter which side of that line you were born on, you ought to have the same opportunity. And you ought to have the same opportunity to do well at science and math and engineering and technology. You ought to have the same opportunity to fulfill those dreams.

Because that day, in the very short, truncated speech that I made - mainly because of the parents and teachers who were there - I said, in this group, there may be a future Navy doctor who does some research and finds the cure for some disease that ravages us today. In this group, could be an astronaut - because that day, the shuttle *DISCOVERY* lifted off on one of its last missions - that they could be an astronaut because it wasn't very long ago that the astronauts aboard *DISCOVERY* that day had been middle schoolers. And the way that they got from middle school onto the shuttle was they studied hard, they worked hard, they learned what they needed to know and they had people who encourage them and inspired them along the way

So basically, that's why we're all here today, that's why we're doing this and that's why we're making these investments in STEM education and research through the Navy and through the Marine Corps. Because we not only owe it to our military, although we do, we owe it to this country and to the people who follow us to help create an America that will continue to lead in innovation and discovery, to create a citizenry that will have the skills to build a better future that our children and our grandchildren are going to need. We hope and I guess we expect that through these education efforts, through these competitions and through these projects that ultimately we will get some folks who get interested in things like naval architecture, or systems engineering, or aeronautics, and will end up working with the Navy and Marine Corps being technical experts, and scientists, and engineers.

One of the things that I get every week, I get a thing called the Weekly Reports and it's every part of the Navy, what's going on that week. And one of the most interesting ones is the Office of Naval Research, because they give me patents that they've gotten that week. And you would be amazed at these things; I am. They just got a patent creating fuel mixing organic material and sea water. Now let me tell you one application, an unmanned, underwater vehicle,

when it gets low on fuel can go down to the bottom of the sea floor, burrow down into the organic matter there, mix it with sea water and refuel and keep going. How's that for science fiction? How's that for being able to do the missions that the Navy is called on to do and is going to be called on to do in the future?

So today, here at this Forum, I'm happy to announce the release of the Navy STEM roadmap, it lays out five priorities for our STEM efforts: inspire, engage, educate, employ and collaborate. It's going to be passed out to you later today. We will:

- **Inspire** the next generation of scientists and engineers.
- **Engage** students in STEM-related, hands-on learning using Navy-relevant content.
- **Educate** students to be confident and well prepared for the STEM disciplines that they'll face if they come into the Navy and Marine Corps, we're going to support academic institutions or the naval scientific community to help them do that.
- **Employ**, and retain, and develop Naval STEM professionals. And,
- **Collaborate** across the Naval STEM enterprise, and with STEM organizations around this country to maximize the benefit to the Navy and Marine Corps.

We spend - a direct Navy investment - \$54 million on STEM. We're going to double that in the next five years. We're going to double it in a targeted and innovative way so that we reach the maximum number of people and have the maximum impact that we can. The metric for success is very simple, if we reach a broader audience, if we reach more students through these STEM initiatives, we can inspire more students to stick with these STEM courses and commit themselves to major in some of these things in college, and increase the numbers that come out and go on to graduate school and stay here, then we will have succeeded. That's what we're working toward. That's why we're all here today. I absolutely refuse to believe that this country

that has led in so many things, that this county that has been so innovative in science and technology, that this country that is known as a hotbed for research, for innovation and for discovery would ever be average at this or anything else.

Thank you for your efforts.