

NARRATIVE FOR STEM CAREER PRESENTATION (Grades 3-5)

Slide 1 – STEM & Your Future

Welcome to a presentation on STEM and your future.

Slide 2 – What is STEM?

What is STEM? STEM is an acronym. That means that each letter in STEM stands for a word. It stands for Science, Technology, Engineering and Math.

Slide 3 – Why is STEM Important?

Why should you care about STEM? Well, for starters, it creates high paying jobs. We all want to have jobs that provide us with lots of money, right? STEM also solves problems. We have cleaner air and water, better medical technologies that have extended the human lifespan and decreased the amount of pain we have to experience...the list goes on and on. Solving all these problems improves our quality of life, and that in turn creates a better world for everyone. Everybody gets to benefit from STEM.

Slide 4 – Benefits of a STEM Career

So what do you get by pursuing a career in science, technology, engineering, and mathematics? For starters, you get to make lots of money. You get to do fun and exciting work. By being part of STEM, you quite literally are creating the future, whether it's the development of new technologies or making new discoveries. You also have more job security. You are less likely to lose your job during economic downturns because you have skills that employers want. STEM allows you to contribute to society, and that in-turn gives your life meaning and purpose, because we all want to feel relevant, that we're valued by others. There's no better way to achieve that than through the STEM fields.

Slide 5 – You can accomplish amazing things with STEM

If you choose to work in a STEM career, you will be able to accomplish amazing things. You will be part of the future.

Slide 6 – 3D Printers

3D printers. These are printers that can produce 3D objects, and this area is growing at incredible rates, with no end in sight. With a 3D printer, we can already print food, organs, medicine, rocket parts, and prosthetic limbs. And 4D printing is already on the way. What is 4D printing? It's the same things as 3D printing, except that the objects it prints out can react to external stimuli. It can reshape or reconfigure itself based on how it has been designed. So what might this look like? Well, if we use 4D printed materials to build a water pipe, if a water pipe leaks, then the pipe could modify itself to stop the leak. There's so much potential here.

Slide 7 – Aerogel

Aerogel is the least dense solid known. It's 99.8% air, and can support up to 1000 times its own weight. This material holds numerous records, including the highest insulation properties known to exist. What this means is that if you had a home in Alaska, and it was the middle of winter, if you had this material lined into your home, you could turn your heat on to whatever temperature

you'd like, and once it reached that temperature, you could turn your heat off, and it would stay that temperature the entire day. (PASS OUT ANY SAMPLES TO STUDENTS)

Slide 8 – Plasma

Plasma is the 4th state of matter, and it is the most common state of matter because that's what all the stars are made of: plasma. Our Sun can be described as one big plasma ball. What are the first three state of matter? Think of an ice cube. An ice cube is a solid. That is the first state of matter. What happens when we apply heat? It starts to melt, turning the solid ice cube into a liquid, water, which is the second state of matter. What happens if heat is then applied to a liquid? It evaporates and goes from a liquid to a gas, which is the third state of matter. Now, if you keep applying more heat, then that gas can be turned into a plasma, the 4th state of matter. As I said, it's what the stars are made of.

With plasma, you can work on advancing space propulsion. Plasma can be used to propel a spacecraft, and it's much more efficient than current rocket technology. For example, instead of taking several months to get to Mars, it could take several weeks with plasma propulsion. You can also research plasma as a clean energy source. That is one of the research goals of the National Ignition Facility, pictured in the middle. This facility is located in California, and they are recreating temperatures inside the Sun; basically, they're creating a mini-Sun. This is achieved through a bunch of lasers shooting one tiny area simultaneously to create fusion, which is what powers the stars. Fusion power could provide society with a clean, inexhaustible, and essentially free source of power. Finally, because plasma is what makes up the stars, if you become an expert in plasma, you can study the stars, including our own Sun. Speaking of the Sun, I have a video to show you that is remarkable. Thanks to NASA, for the first time in human history, we can now see the Sun up close. (SHOW VIDEO)

Slide 9 – Robotics

If you like robots, then you should consider a career in robotics. There are so many beneficial things that can be accomplished with robots. Robots are already used for search & rescue operations, but they can also be found in rooms where surgeries are taking place. Robots also have a bright future in space exploration. NASA has a robot called Robonaut, which assists astronauts in performing tasks.

By being part of this future, you will have the opportunity to either build the robots, program them, or run experiments with them...all the while making lots of money. Employers are continually looking to hire people with these kinds of skills, so anyone pursuing a career working on robots will have lots of work for their entire career, because the growth in robotics will continue well into the future.

Going back to the beginning of this presentation, we talked about how the STEM fields improve society and can give life meaning & purpose. The next video really highlights those points. Through STEM, people are now being given the opportunity to walk again. To be able to give someone the ability to walk again is worthy of recognition for such an amazing contribution. They will be remembered, and they deserve lots of money for it. (SHOW VIDEO)

Slide 10 – Space Elevator

The space elevator is what it sounds like...an elevator that can take you into space. This would be the greatest construction project in human history. Building a space elevator will make access to space much more affordable. Right now, it costs about \$10,000 per pound to send something into space. With a space elevator, the cost could come down to \$100 per pound...a huge cost difference. It would also allow for daily trips to space.

The space elevator would be made with carbon nanotubes. Carbon nanotubes are a new kind of material that's made through a nanotechnology process. Nano means "small" in Greek. As its name implies, carbon nanotubes are made up of carbon atoms, arranged in a tube-like form. They are hundreds of times stronger than steel, and six times lighter. Carbon nanotubes can also withstand higher temperatures & pressures than steel. Scientists have already made carbon nanotubes in the lab, but in very tiny amounts that are very expensive.

Research & experiments are being conducted to see how we might achieve this. The video you're about to see is animation of what a space elevator might look like, although it's more of a ride than an elevator. (SHOW VIDEO)

Slide 11 – Space Jumping

Ever wanted to jump back to Earth from the edge of space? Soon you will have that opportunity. This was successfully attempted in 2012 by Felix Baumgartner. As a result of that effort, three new companies have formed. They are developing spacesuits that you and I would use when jumping from the edge of space. This activity will be available in the near future. The video you're going to see is the body-cam footage from the 2012 jump. (SHOW VIDEO)

Slide 12 – Spaceship Building

A career in spaceship building is now possible. This is happening right now in Mojave, California. Trips to space are planned in the near future, and eventually trips to the moon will be possible.

In this kind of career, you can do a variety of things. You can develop & test the rocket engines, design & build the spacecraft, or even work on developing life support systems. Life support systems are what keep humans alive in space. So everything we need to survive on Earth, like oxygen, water, tolerable temperature, the right atmospheric pressure, etc., we need to provide to people traveling in a spaceship. (SHOW VIDEO)

Slide 13 – Underwater Buildings

If you've ever wondered what it would be like to live underwater, then you're going to have the opportunity to find out. Underwater restaurants and hotels already exist. Both pictures on the right are actual places. The top-right picture is located in the Maldives. The bottom-right picture is located in Israel. There are plans for the development of underwater hotels in Dubai, and also permanent residences. Some people want to permanently live beneath the ocean's surface. It is very likely that, in your lifetime, you can choose to live on land, underwater, or for a limited time, in space. Now here's a video of the restaurant pictured top-right. (SHOW VIDEO)

Slide 14 - Questions (ANSWER QUESTIONS FROM STUDENTS)