Engineering is Out of This World!

Acoustical Engineering

NASA is developing a new rocket called the Space Launch System, or SLS. The SLS will be able to carry astronauts and materials, known as payloads. **Acoustical engineers** are helping to build the SLS.

Sound is a vibration. A vibration is a rapid motion of an object back and forth.

Hold a piece of paper up right in front of your lips. Talk or sing into the paper.

What do you feel? _____

What do you think is causing the vibration?

_____

If too much noise, or **acoustical loading**, is caused by air passing over the SLS rocket, the vehicle could be damaged by the vibration!

NAME: _____

Typical Sound Levels in Decibels (dB)

130 — Jet takeoff

120 — Pain threshold

110 — Car horn

100 — Motorcycle

90 — Power lawn mower

80 — Vacuum cleaner

70 — Street traffic

—Working area on ISS (65 db)

60 — Normal conversation

50 — Rain

40 — Library noise

30 — Purring cat

20 — Rustling leaves

10 — Breathing

0 — Hearing Threshold

Hearing protection is recommended at 85 decibels.

(Continued from front)

Experiment with the paper.

Does talking louder or softer change the vibration?

Is the vibration affected by the pitch of your voice? (Hint: Pitch is how deep or high the sound is.)

Change the angle of the paper. What happens?

Why do you think NASA hires acoustical engineers? (Hint: Think about how loud rockets are!)

How do you think the noise on an airplane compares to the noise on a rocket?

NASA is currently researching ways to reduce the noise made by airplanes.

In what ways does an airplane make noise? (If you haven't flown, think of riding in your family car or standing on a busy street corner.)

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Aerospace

NASA is developing a new rocket called the Space Launch System, or SLS. The SLS will be able to carry astronauts and materials, known as payloads. **Aerospace engineers** are helping to build the SLS.

Aerospace engineers design, build, and test aircraft and spacecraft.

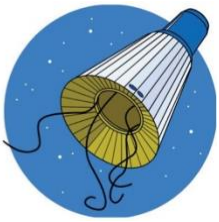
Circle the image of the spacecraft below.

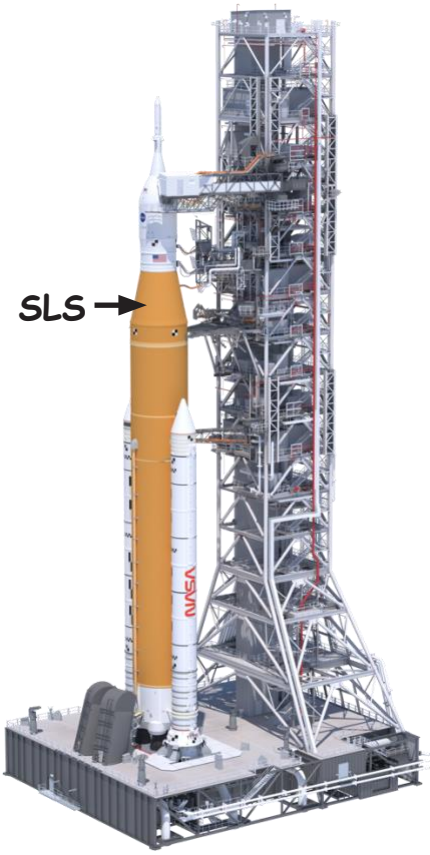


These spacecraft were launched by NASA.


Space Shuttle


Saturn


Gemini



NAME: _____

Here is a list of some of the countries that have launched spacecraft into space.

- China
- France
- India
- Israel
- Iran
- Japan
- North Korea
- Russia
- United States

SLS will carry a spacecraft named Orion. Here is a picture of Orion.

Pretend you are an aerospace engineer working for NASA. Draw a picture of a spacecraft you would like to build.

Draw a picture of a payload you want to launch into space on the SLS.

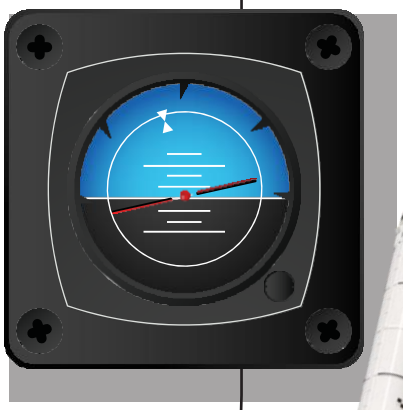
Engineering is Out of This World!

Electrical Engineering

NASA is developing a new rocket called the Space Launch System, or SLS. The SLS will be able to carry astronauts and materials, known as payloads. **Electrical engineers** are helping to build the SLS.

Electrical engineers design, develop, build, and test electrical systems and electronic equipment. At NASA, these systems are called **avionics**.

Computers play a big role in the avionics system in a spacecraft.



Look at the world around you.

What tasks do computers help you and your family complete?

_____

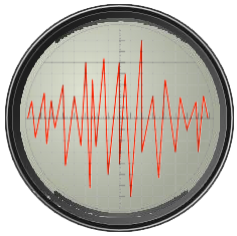
NAME: _____

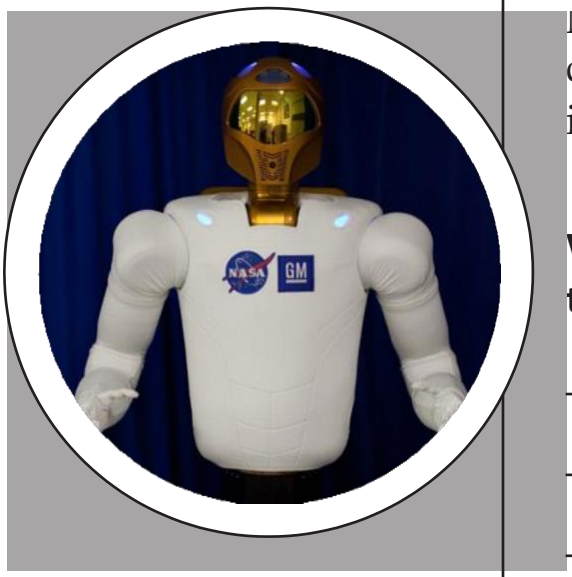
Did you know?!

Avionics in the SLS will "tell" the rocket where it should go, how it should move its parts, and what path to follow to get itself where it needs to go.

Circle your answers.

Which of the electronic devices shown have you used?





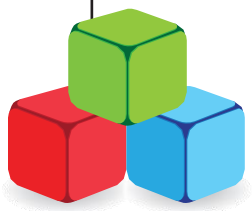
NASA has created a robot, a type of electronic device, named Robonaut to help astronauts work in space!

What tasks do you think a robot could do to help build SLS?

Engineering is Out of This World!

Materials Engineering

NASA is developing a new rocket called the Space Launch System, or SLS. The SLS will be able to carry astronauts and materials, known as payloads. **Materials engineers** are helping to build the SLS.



Materials engineers work with stuff like plastic and aluminum. They make these materials into items we can use.

Name another type of material.

_____

Aluminum will be used for the core stage of the SLS because it is light.

Name one other thing that you know is made of aluminum.

_____

NAME: _____

Did you know?!

NASA materials engineers developed material for space suits that is now used to keep firefighters safe!

These engineers also developed the material that is used in "invisible" braces!

Find a toy or other object in your classroom and look at it closely.

From what materials is the object made?

_____

Why do you think this material was used?

_____

_____

Draw a picture of your object.
Label the different materials.

Look at the SLS rocket on the other side of this sheet.

Name a material that engineers would not want to use on a rocket.

_____

Why would that material be a poor choice to use for a rocket?

_____

_____

National Aeronautics and Space Administration

Engineering is Out of This World!

Mechanical Engineering

NASA is developing a new rocket called the Space Launch System, or SLS. The SLS will be able to carry astronauts and materials, known as payloads. **Mechanical engineers** are helping to build the SLS.

Mechanical engineers design, develop, build, and test mechanical devices, including tools, engines, and machines.

NASA's SLS rocket needs mechanical engineers to work on the many different components of the rocket!

Look at the image of the SLS rocket.

What parts of the rocket might have been designed by a mechanical engineer?

_____

NAME: _____

Did you know?!

One component NASA engineers designed is used to steer the rocket. This part moves the nozzle of the rocket engine to point the SLS in the right direction!

Power up! Mechanical engineers at NASA developed the first cordless power tools.

Why did the tools need to be cordless?

_____

_____

What cordless tools do you have at home?

_____

Look around your classroom.

List 3 different machines that you see.

_____

What type of machine would you like to design? Think hard! On the space below, describe the machine that you designed. Be sure to explain what the machine will do.

_____

_____

Draw a picture of your machine in the space below.