Think Out of the Bus

Experiment Express

STEM Field of Study

Engineering

Specific STEM Area

Safety

Automobile Engineering

Age Group

All

Cost

$0 - $5

Time

45 minutes

Materials

Pen / Pencil; Colored Pencils, Lab Notebook, Magazines or Newspaper articles with pictures of school buses; scissors, glue

Safety

It's a good idea to have an adult nearby

IEP Goals

Academic

Behavioral

Motor

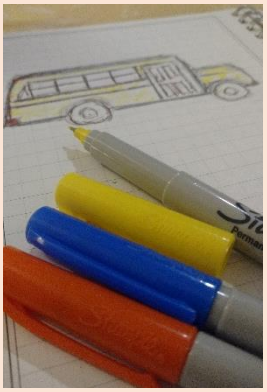
Question:

Can you make buses safer? If so, How?

Hypothesis:

Before you do this experiment; try to predict the answer to the question above. Write down your Hypothesis in your logbook

Instructions:



1. Gather all your materials together.
2. Review all Safety Precautions.
3. Research what buses looked like when they were first invented in 1930's. Website in the Additional Resources Section.
4. Sketch a drawing of the exterior of your school bus.
5. Sketch a drawing of the interior of your school bus.
6. If you cannot draw – you can opt to create a collage of school buses as well.
7. Indicate the changes you would make to the School Bus design to make it safer.
8. If you could change the look of the School Bus; show the changes in design that you would make.

The Magic of the School Bus

Think about it!

One of our favorite story book series here at STEM with the Saints is the Magic School Bus! We absolutely love Ms. Frizzle and her STEM adventures. This experiment is to honor the wondrous, creative, "*Think out of the Bus*," mind of Joanna Cole – The Magic School Bus author.

While the design of the school bus has not changed significantly in over 70 years; there have been significant safety changes such as: retractable stop sign, flashing lights, reinforced seats and emergency exits throughout the bus. Truly these safety improvements have saved the lives of so many children and we are grateful for the engineers who help ensure the safety of kids everywhere.

So, what we want from you is to explore your creative side and design your own school bus! What would you add to make your school bus safer and more fun? Additionally, if your bus were "magic," where would you want to go and what would you want to do? Make sure to include the science, technology, engineering, and math with your adventure. We would love to see your designs and creative thought – who knows, you may earn a special feature spot on our website.

Think Out of the Bus

Post Experiment Questions for Adults to ask:

1. What similarities did you notice between the school buses of the 1930's and the school buses of present day?
2. What differences did you notice between the school buses of the 1930's and the school buses of today?
3. What safety feature did you add to your school bus and why?
4. How will your new safety feature function?
5. Was your hypothesis correct?

Let's talk!

Discussion of Results / Post Experiment Answers:

1. The shape and overall design of the school bus. Your student may indicate that all busses are long and tall, seat several children, yellow / orange color, have an accordion door, long line of windows, large wheels, and so on.
2. The main changes that can be seen are in the are of safety. The retractable stop signs on the driver side of the bus and the retractable arm in front of the bus; numerous emergency window exits, emergency floor, rear and roof exits, and reinforced seats. Your student may also indicate the development of a bus for the individuals with a handicap and the addition of a wheelchair lift.
3. Answers will vary.
4. Answers will vary.
5. If your hypothesis was correct, Congratulations! If not, do not worry and keep trying!

Draw your own conclusion:

You may have noticed that there are some buses that have a flat front and some that do not. Our question to you is – do you know why?

Well the school buses with a front hood that extends out are the ones that have an engine in front – like cars. So, if the bus has a flat front – where do you think the engine is located? Which design do you prefer the school bus with a front that extend out or one that is flat?

If you could place the engine anywhere on the bus – where would you place it so that it is safe from accident or injury?

Expansion Experiments:

We all know the great adventures of Ms. Frizzle and her golden bus; but what we don't know is: What would Ms. Frizzle do if her bus broke down but she still had to create a STEM experiment to teach her students? What we want you to do is create a STEM with the Saints experiment from a Magic School Bus book. We want you to use the book as your inspiration but develop an experiment that can be done realistically in the home. Let us know what you come up with and share it with us at: www.stemwithsaints.org

Log your work:

Absolutely!

This is a perfect opportunity to learn how to log and maintain a record of your ideas!

Real World Application:

Transportation

Auto Engineering

Mechanical Engineering

Additional Resources:

https://www.businessinsider.com/why-yellow-school-buses-still-look-same-2020-2

https://americanhistory.si.edu/america-on-the-move/school-bus

https://www.smithsonianmag.com/history/history-how-school-buses-became-yellow-180973041/

Draw 50 Cars, Trucks, and Motorcycles: The Step-by-Step Way to Draw Dragsters, Vintage Cars, Dune Buggies, Mini Choppers, and Many More... by Lee J. Ames

How to Draw Cars, Trucks, Planes, and Other Things That Go!: Learn to Draw Step by Step for Kids by Dylanna Press