Family STEAM Challenge

Foil Boats

Criteria: Create an aluminum foil boat that can hold as many pennies as possible without sinking or capsizing. Watch this video for more details: Foil Boats.

Constraints (limitations):

These are the items you can use:

- 14 inches of aluminum foil
- pennies
- water that is at least 6 inches in depth

Iterations (retrying): Retry the challenge to see if you can improve your design and hold more pennies.

Share: Email a picture of your design or outcome to jlauriat@wheatonchristian.org.

Extension: Try using different coins, pennies, nickels, dimes, and quarters, to determine the highest amount of money your boat can hold without sinking or capsizing.

Mrs. Lauriat
Sixth Grade Science Teacher
STEAM+ and Junior High Coordinator

wheaton christian
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Family STEAM Challenge

Roller Coaster

Criteria: Create a marble run using paper towel tubes and paper plates. Begin with listening to the book, "Roller Coasters" by Marla Frazee.

Constraints (limitations):

Make sure your marble stays on the track you build. The marble must land in cup or plate at the end. These are the items you can use:

- Paper tubes
- tape
- paper plates
- marbles
- paper cup

Iterations (retrying): Retry the challenge to see if you can improve your design and make it as tall as possible.

Extension: Try adding a loop into your coaster. Can you get the marble to stay on the track with the loop?

Share: Email a picture of your design to jlauriat@wheatonchristian.org.

Mrs. Lauriat
Sixth Grade Science Teacher
STEAM+ and Junior High Coordinator

Engineering Design Challenge: Rollercoaster

Ask: Can you create a roller coaster with paper tubes and paper plates? Could you create one with at least one loop?

Imagine: Brainstorm ideas with your group. How will you test your design?

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Plan: Draw a diagram of what you will build. What steps will you take to build it?

Drawing	Steps

Create: Follow your steps and create your design. Test it!

- ✓ How can you measure your roller coaster?
- ✓ How did you determine this measurement?

Improve: What works? What doesn't work? Modify your design and test it again.

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Communicate: Tell others about your design and results. Email a picture to Mrs. Lauriat at jlauriat@wheatonchristian.org

Family STEAM Challenge

Airplanes

Criteria: Create a paper airplane that can carry cargo and glide more than ten feet (not hurled, but actually glide).

Constraints (limitations):

The paper airplane must carry cargo of coins (money). You can tape the money onto your plane. The winner will be the family who can fly with the most money. These are the items you can use:

- Paper or construction paper
- Coins
- Tape

Iterations (retrying): Can you redesign your paper airplane so that it can carry more money?

Extension:
What else can your airplane carry? Legos? Toothpicks? How many of each?

Share: Email a picture of your design to jlauriat@wheatonchristian.org.

Mrs. Lauriat
Sixth Grade Science Teacher
STEAM+ and Junior High Coordinator

Engineering Design Challenge: Paper Airplane

Ask: Can you create a paper airplane out of paper that can hold the most money and travel more than ten feet? Can you plane hold anything else?

Imagine: Brainstorm ideas with your family. How will you test your design?

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Plan: Draw a diagram of what you will created. What steps will you take to fold your plane?

Drawing	Steps

Create: Follow your steps and create your design. Test it!

- ✓ What size is the paper you are using?
- ✓ How will you fold your paper airplane?

Improve: What works? What doesn't work? Modify your design and test it again.

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Communicate: Tell others about your design and results. How much money did your paper airplane hold? Email a picture to Mrs. Lauriat at jlauriat@wheatonchristian.org.

Family STEAM Challenge 4

Bridges

Criteria: Create a bridge that can hold a 16 ounce can of food. Research the type of bridge that you want to build using this site: Bridge Facts.

Constraints (limitations):

The bridge must span an opening of 30 cm and must be at least 10 cm wide. It does not need support legs. It does not need to be movable. It will be tested by having a 16 ounce can of food on it. These are the items you can use:

- cardboard
- string
- popsicle sticks
- pipe cleaner
- tape/glue

Iterations (retrying): Can you redesign your bridge to hold more weight?

Share: Email a picture of your design to jlauriat@wheatonchristian.org.

Extension:
What else can you make your bridge out of? Legos? Toothpicks? How does that improve your design?

Mrs. Lauriat
Sixth Grade Science Teacher
STEAM+ and Junior High Coordinator

Engineering Design Challenge: Bridge

Ask: Can you create a bridge that can hold a 16 ounce can of food? What type of bridge will support the most weight? Type of Bridges

Imagine: Brainstorm ideas with your family. How will you test your design?

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Plan: Draw a diagram of what you will created. What steps will you take to build your bridge?

Drawing	Steps

Create: Follow your steps and create your design. Test it!

- ✓ Do the materials you use affect the strength of your bridge?
- ✓ What type of bridge will hold the most weight?

Improve: What works? What doesn't work? Modify your design and test it again.

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Communicate: Tell others about your design and results. How much weight did your bridge hold? What type of bridge did you build and why? Email a picture to Mrs. Lauriat at jlauriat@wheatonchristian.org.

Family STEAM Challenge 5

Bridges 2.0

Criteria: Create a bridge that can hold as much weight as possible. Research the type of bridge that you want to build using this site: Bridge Facts.

Constraints (limitations):

The bridge must span an opening of 30 cm and must be at least 10 cm wide. It does not need support legs. It does not need to be movable. It will be tested by having a 16 ounce can of food placed on it. These are the items you can use:

- Cardboard
- Toothpicks
- K'nex
- string
- popsicle sticks
- legos
- tape/glue

Iterations (retrying): Can you redesign your bridge to hold more weight?

Share: Email a picture of your design to jlauriat@wheatonchristian.org.

Extension:
Can you make your bridge look esthetically pleasing? Can you use colors and build it so that it looks beautiful and still holds a lot of weight?

Mrs. Lauriat
Sixth Grade Science Teacher
STEAM+ and Junior High Coordinator

Engineering Design Challenge: Bridge

Ask: Can you create a bridge that can hold the most weight? What type of bridge will support the most weight? Type of Bridges

Imagine: Brainstorm ideas with your family. How will you test your design?

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_____

Plan: Draw a diagram of what you will created. What steps will you take to build your bridge?

Drawing	Steps

Create: Follow your steps and create your design. Test it!

- ✓ Do the materials you use affect the strength of your bridge?
- ✓ What type of bridge will hold the most weight?

Improve: What works? What doesn't work? Modify your design and test it again.

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Communicate: Tell others about your design and results. How much weight did your bridge hold? What type of bridge did you build and why? How did you make it look beautiful? Email a picture to Mrs. Lauriat at jlauriat@wheatonchristian.org.

Family STEAM Challenge 6

Maze Game

Criteria: Create a maze game for a marble.

Constraints (limitations):

Use a lid to a shoe box or cardboard box for the base. Make sure the size you choose you can lift and move so you can guide the marble through the maze. Use what you have around your house to make this maze. These are some ideas of items you can use:

- Cardboard
- Glue
- K'nex
- Popsicle sticks
- Legos
- tape
- toothpicks
- string
- straws

Iterations (retrying): Can you make the marble stay within the walls you create? How creative or complicated can you make the maze?

Share: Email a picture of your design to jlauriat@wheatonchristian.org.

Extension:
Consider purchasing a nano robot (Hexbug) that can go through your maze.

Mrs. Lauriat
Sixth Grade Science Teacher
STEAM+ and Junior High Coordinator

Engineering Design Challenge: Maze Game

Ask: Can you make a maze that allows a marble to roll through it? Can you make the marble stay within the walls you create?

Imagine: Brainstorm ideas with your family. How will you test your design?

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Plan: Draw a diagram of what you will created. What steps will you take to build your bridge?

Drawing	Steps

Create: Follow your steps and create your design. Test it!

- ✓ How creative or complicated can you make the maze?

Improve: What works? What doesn't work? Modify your design and test it again.

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Communicate: Tell others about your design and results. Email a picture to Mrs. Lauriat at jlauriat@wheatonchristian.org.