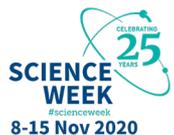


# MIC STEM Challenges

## for Tipperary Festival of Science



8-15 November 2020



Take a picture of your designs & tag us in your posts!

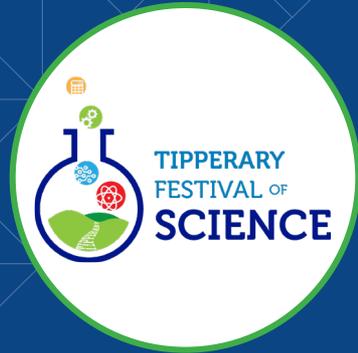
 @MICLimerick, @ScienceTipp, @ScienceWeek  
@ListonMaeve

 @maryimmaculatecollegeireland,  
@TipperaryFestivalofScience, @ScienceWeekIreland



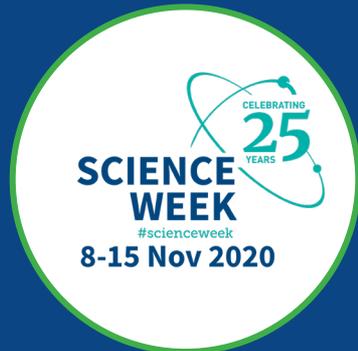
# MIC STEM Challenges

## for Tipperary Festival of Science



To celebrate Tipperary Festival of Science, from Sunday 8 November to Sunday 15 (Science Week), Mary Immaculate College (MIC) has designed lots of fun engineering and construction activities for you to do at home or at school.

You can carry out these activities as part of a team at home or in school.



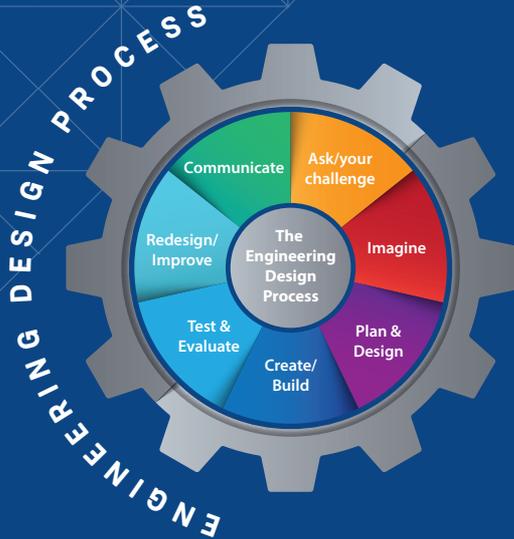
You will be able to source all of the materials needed for each puzzle from what you have in your home or classroom.

 @MICLimerick, @ScienceTipp, @ScienceWeek, @ListonMaeva

 @maryimmaculatecollegeireland, @TipperaryFestivalofScience, @ScienceWeekIreland

# MIC STEM Challenges

## for Tipperary Festival of Science



You will think and act like an Engineer and follow the Engineering Design Process throughout these challenges. The Engineering Design Process is a series of steps that guides engineering teams as they solve problems.

We would love to see some of your designs so be sure to get your parents, guardians or teachers to take a picture of your design and tag us in their social media posts using #ScienceTipp and #STEMChallengesMIC.

 @MICLimerick, @ScienceTipp, @ScienceWeek, @ListonMaeva

 @maryimmaculatecollegeireland, @TipperaryFestivalofScience, @ScienceWeekIreland

# MIC STEM Challenge

# 1.



## Today's Challenge:

- You and your team have been selected to make the tallest tower possible from 90 cm of tin foil and **NOTHING** else.

## What you need to do to complete the challenge:

1. You will design a tower.
2. You will act like an Engineer and follow the Engineering Design Process.
3. Your device can be any dimensions, but it has to be as tall as possible.
4. You can only use 90 cm of tin foil and nothing else. That is no glue, tape, paper clips etc.
5. The tower must be free standing and cannot be supported or propped up against anything.

# MIC STEM Challenge

## 2.



### Today's Challenge:

- You and your team have been selected to make the strongest device out of 10 straws to hold up as much weight as possible.

### What you need to do to complete the challenge:

1. You will design a device that can hold a small container on top of it (paper/plastic cup).
2. You will act like an Engineer and follow the Engineering Design Process.
3. You can only use a maximum of ten straws.
4. You can only use use straws, paper clips and elastic bands but nothing else. That is no glue or tape.
5. The device must be free standing and moveable (it cannot be attached to any surface).
6. Once you have your device built, test the strength of your design by filling the container gradually with weights (add coins/marbles/paper clips (whatever you have at home) one by one into the container).

# MIC STEM Challenge

# 3.



## Today's Challenge:

- Make the tallest tower possible from 6 index cards and **NOTHING** else

What you need to do to complete the challenge:

1. Design a tower.
2. Act like an Engineer and follow the Engineering Design Process.
3. Your device can be any dimensions, but it has to be as tall as possible.
4. You can only use 6 note cards and nothing else, so that means no glue, tape, paper clips etc.
5. The tower must be free standing and cannot be supported or propped up against anything.

# MIC STEM Challenge

# 4.



## Today's Challenge:

- You and your team have been selected to make the tallest tower possible from 2 sheets of newspaper and 30 cm of tape.

## What you need to do to complete the challenge:

1. You will design a tower.
2. You will act like an Engineer and follow the Engineering Design Process.
3. Your device can be any dimensions, but it has to be as tall as possible.
4. You can only use 2 sheets of newspaper, 30 cm of tape and nothing else.
5. The tower must be free standing and cannot be supported or propped up against anything.

# MIC STEM Challenge

# 5.



## Today's Challenge:

- You and your team have been selected to make a strong device to hold a heavy book using 10 sheets of newspaper.

## What you need to do to complete the challenge:

1. You will design a device that can hold a heavy book, 15cm above the surface of a table for at least 10 seconds.
2. You will act like an Engineer and follow the Engineering Design Process.
3. You can only use 10 sheets of newspaper and nothing else. That is no glue or tape.
4. The device must be free standing and cannot be supported or propped up against anything.

# MIC STEM Challenge

# 6.



## Today's Challenge:

- Design 10 different uses for a paper clip

What you need to do to complete the challenge:

1. You will design 10 different and completely new uses for a paper clip.
2. You will act like an Engineer and follow the Engineering Design Process.
3. You can only use 1 paper clip per new design
4. You cannot use anything else besides the paper clip. That is no glue, tape, paper clips etc.

# MIC STEM Challenge

# 7.



## Today's Challenge:

- You and your team have been selected to make a chair to hold a person above the ground for 5 seconds using newspaper and or magazines.

## What you need to do to complete the challenge:

1. You will design a chair that can hold a person above the ground for 5 seconds using newspaper and/or magazines.
2. No body part of the person can be touching the ground when he/she is sitting on the chair.
3. You will act like an Engineer and follow the Engineering Design Process.
4. You can only use newspaper and or magazines, tape and a scissors.
5. There is no limit to the amount of paper you can use.
6. The device must be free standing and cannot be supported or propped up against anything.

# MIC STEM Challenge

# 8.



## Today's Challenge:

- You and your team have been selected to make an architectural piece of design using 20 plastic/paper cups.

## What you need to do to complete the challenge:

1. You will design an elaborate structure using 20 plastic cups.
2. Only one cup can act as the base for the rest of the cups to balance on.
3. You will act like an Engineer and follow the Engineering Design Process.
4. You can use 20 plastic/paper cups only. No tape or glue can be used.
5. The structure must be free standing and cannot be supported or propped up against anything.

# MIC STEM Challenge

# 9.



## Today's Challenge:

- You and your team have been selected to design a ramp for a small matchbox car to jump as far as possible.

## What you need to do to complete the challenge:

1. You will design a course for a small matchbox car with a ramp so that the car can jump as far as possible from the ramp and along the ground.
2. You will act like an Engineer and follow the Engineering Design Process.
3. You will need all different types of cardboard, tape, scissors and a ruler/measuring tape.
4. There is no limit to the amount of cardboard you can use.
5. The track can be at least 2 metres long.
6. The device must be free standing and cannot be supported or propped up against anything.

# MIC STEM Challenge

# 10.



## Today's Challenge:

- You and your team have been selected to make the longest trickiest marble run using cardboard and toilet / kitchen roll inserts.

### What you need to do to complete the challenge:

1. You will design the longest, trickiest course in which to deliver a marble to its final destination. The longer and trickier the better.
2. The marble must do the following at least once as it is moving through its track:
  - Go up
  - Come down
  - Fly through the air
  - Change direction/turn
3. You will act like an Engineer and follow the Engineering Design Process.
4. You can only use cardboard and toilet / kitchen roll inserts, tape and a scissors.
5. There is no limit to the amount of paper you can use.
6. The track can be at least 5 metres long.
7. The device must be free standing and cannot be supported or propped up against anything.

# MIC STEM Challenge

# 11.



## Today's Challenge:

- You and your team have been selected to design & make a delivery device that can take a marble 50cm -100 cm across the room & drop it into an open & empty plastic bottle.

## What you need to do to complete the challenge:

1. You will design a course in which to deliver a marble to its final destination (an open & empty plastic bottle).
2. You will act like an Engineer and follow the Engineering Design Process.
3. You can only use cardboard and toilet / kitchen roll inserts, tape and a scissors.
4. There is no limit to the amount of materials you can use.
5. The track can be at least 2-4 metres long.
6. The device must be free standing and cannot be supported or propped up against anything.

# MIC STEM Challenge

# 12.

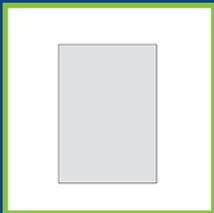


## Today's Challenge:

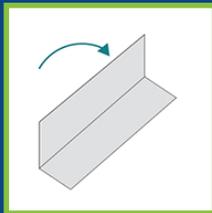
- Paper Airplanes

What you need to do to complete the challenge:

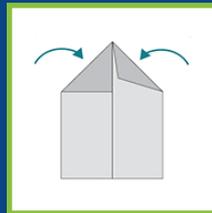
1. You will need: Paper
2. Make the following paper airplane.
3. Test how far you can fly the plane.
4. Can you improve the **design**.



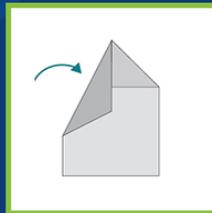
Find an A4 size paper.



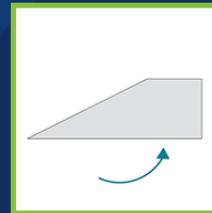
Fold the paper in half lengthwise, making sure the fold is properly centered and set. Unfold the sheet.



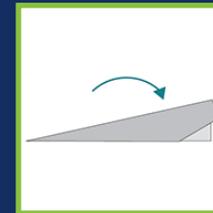
Take the corners of the sheet and fold them so they meet the center crease.



Take the new corners resulting from the previous step and fold them in again.



Fold the entire sheet in half, so that the folds made earlier are in.



Fold the edges on both sides to form the wings and to make the plane finally fly!



# MIC STEM Challenge

# 12.

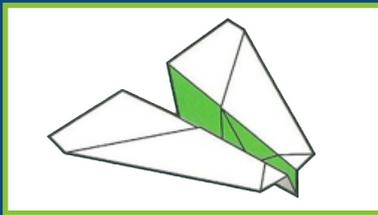


## Today's Challenge:

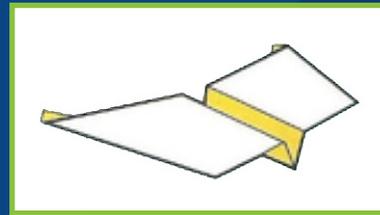
- Paper Airplanes

What you need to do to complete the challenge:

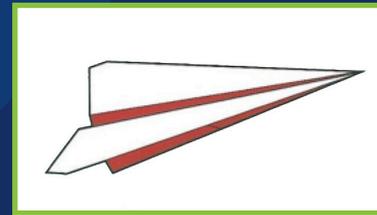
1. You will need: Paper
2. Now try & make the following 4 paper airplanes:  
| Bug | Glider | Dart | Jet |
3. Make a prediction which paper airplane will be the best.



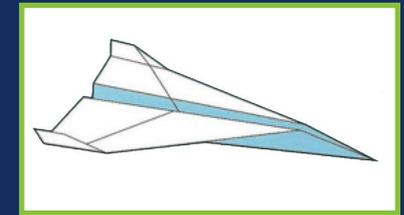
Bug



Glider



Dart



Jet

# MIC STEM Challenge

# 12.



## Today's Challenge:

- Paper Airplanes

Measure and record how far each plane went in the five trials in the table below.

	Bug	Glider	Dart	Jet
Trial 1				
Trial 2				
Trial 3				
Trial 4				
Trial 5				

Which was the best? Why?

Which was the least successful design? Why?

# MIC STEM Challenge

# 12.



## Today's Challenge:

- Paper Airplanes

Can you alter your throwing technique?

Try throwing this way as in the picture below and re race your air planes.

**Q: What is the most effective way to throw a paper airplane? Let them show you.**

Then show them this and let them try it out.

The goal of tossing an airplane is to get it to glide smoothly and gently, flying straight or in a gradual curve. Ken Blackburn, shown here, must have the knack: From 1983 to 1996, he held the Guinness World Record for time aloft for paper airplanes. In 1998, he regained the record with a 27.6-second flight.

