

FIRST[®] LEGO[®] League ***TUT******RIALS***

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IDENTIFYING A PROBLEM

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ABOUT THE AUTHOR

- Seshan Brothers were on team Not the Droids You Are Looking For
- Our research project for Trash Trek was a Global Innovation Award semi-finalist project (Top 20 out of 30,000 teams).
- Our research project in Nature's Fury won Innovative Solution at the FIRST LEGO League International Open in Toronto.
- Our research project for World Class was EV3Lessons.com! ;-)
- We are the Champion's award winners from World Festival 2018



GETTING STARTED IN APRIL

- Usually, *FIRST* LEGO League releases the theme and reveals the Challenge Mat and Models during the World Festival in April.
- *FIRST* and LEGO Education also release several teasers and images on their social media channels
- While you will not know the details of the challenge until August, you can start thinking about the *high-level topic* well in advance

SAMPLE RELEASED TEXT FROM MASTERPIECE

“...the new season will focus on imagining and innovating new ways to create and communicate art across the globe through”

“...join our arts-inspired robotics season”

“Lights, camera, STEAM! Science, technology, engineering, arts, and math (STEAM) inspire big ideas, bold action – and creativity. Our skills make it possible to create art and experiences that bring us together, entertain us, and move us.

“...we’re shining a spotlight on the role STEM plays in the arts”

Source: Pre-Season Guide provided on FLLTutorials → Worksheets

USING THE RELEASED TEXT AND IMAGES

- Between April and August, try to go on some early field trips to inspire project topics
 - In Animal Allies, many teams visited Zoos and Aquariums over the summer
 - Where could you go for the MASTERPIECE season?
- Do some preliminary online research related to the topic
- Your goal is not to finish your project, but get some general ideas for possible topics related to the theme.



CHALLENGE RELEASED IN AUGUST



START

Explore your energy journey. How can you reimagine a better energy future? It starts here, with your critical thinking and innovation leading the way to tomorrow's energized world with *FIRST*® ENERGIZESM presented by Qualcomm.

➔ Identify a specific problem related to improving your energy journey.

An energy journey is where energy comes from and how it is distributed, stored, and used. The Project Sparks (see Sessions 1-4) explore problems related to different energy journeys. Your problem could come from a Project Spark, or it could be a different problem you want to solve.

➔ Research your problem and solution ideas.

Explore energy sources and how energy is stored, distributed, and used in your community. Can you find ways to make part of your energy journey better? Can you improve one step to be more efficient, reliable, affordable, accessible, or sustainable? What solutions already exist? Are there any experts or users you could interview?

➔ Design and create a solution that could improve your energy journey.

Use your research and explorations to either improve an existing solution used in your energy journey or design a new innovative solution. Can you make different energy technology choices? Make a drawing, model, or prototype of your solution.

➔ Share your ideas, collect feedback, and iterate on your solution.

The more you iterate and develop your ideas, the more you will learn. What impact will your solution have on your community?

➔ Communicate your solution with a live presentation at an event.

Prepare a creative and effective presentation that clearly explains your Innovation Project solution and its impact on others. Make sure your whole team is involved in sharing your progress.

READ THE CHALLENGE DOCUMENTS CAREFULLY

- Sometimes, you are allowed to pick only from a certain sub-set of topics (e.g. Nature's Fury listed which natural disasters were allowed)

- | | |
|---|----------------------|
| • Avalanche or landslide | • Tornado or cyclone |
| • Earthquake | • Tsunami |
| • Flood | • Volcanic eruption |
| • Hurricane | • Wildfire |
| • Storm (wind, sand, blizzard, or rain) | |

- Sometimes, it calls for something specific (e.g. Senior Solutions required a Senior Partner for every team)

FIND A SENIOR PARTNER

Your Project challenge this season is to solve a problem faced by seniors as they age. To start, your team needs to find a senior partner. Many people define seniors in different ways. For the Senior Solutions Project, look for an adult who is 60 years of age or older.

PICK A PROBLEM THAT IS MEANINGFUL

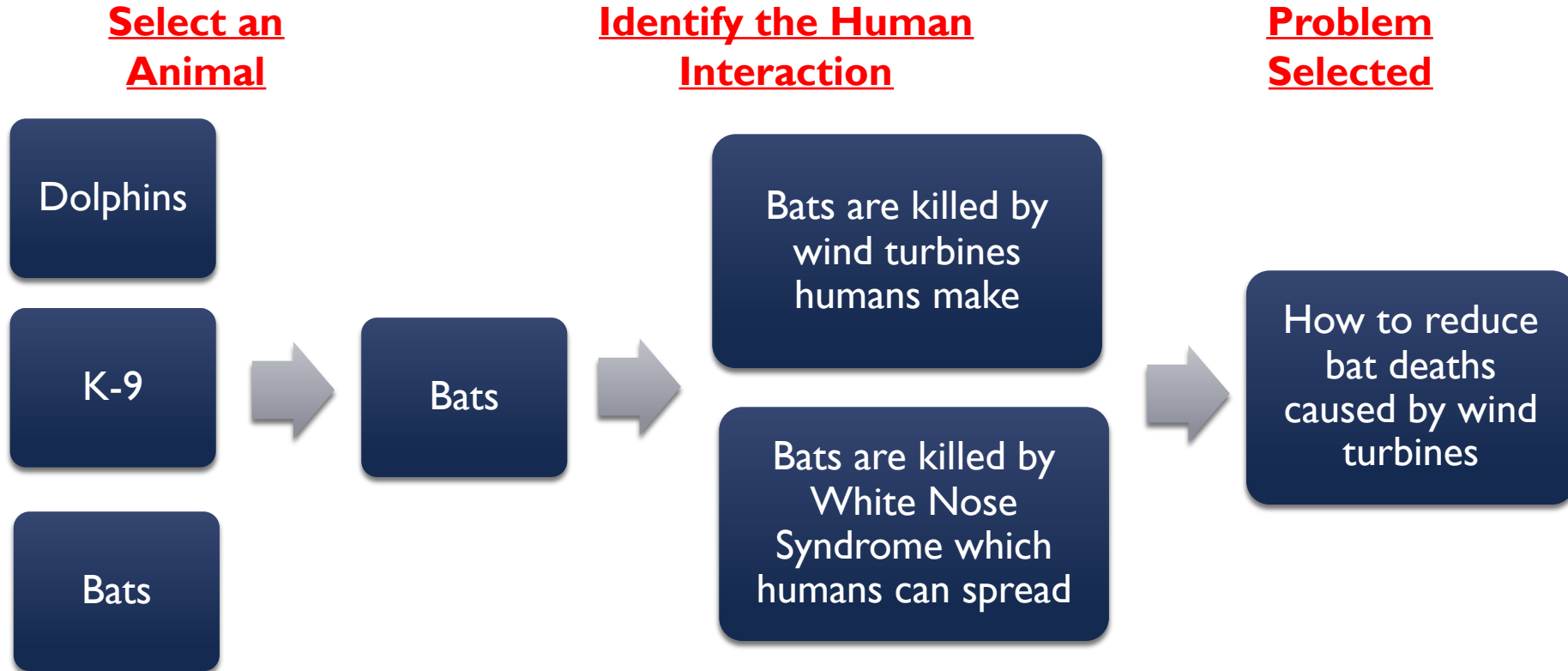
- Always think of a problem first, not the solution
- The problem can be as small or big as you want
- Most students relate better to local problems that impact their daily lives in some way
- Do not worry that there is already a solution to the problem. As part of the process, you will look at existing solutions and see if you can make improvements.

PICK A TOPIC EVERYONE AGREES UPON

- Everyone works on the project
 - Pick a topic that all team members can agree on/are interested in
- One idea is to have all team members do a little bit of research on their favorite topic and then present this topic to each other.
 - Then the team decides which topic they are most interested in to pick for their team's project.
 - Next, the team identifies a specific problem within this topic



“IDENTIFYING A PROBLEM” PROCESS



Sample based on team that participated in *FIRST* LEGO League Animal Allies

SAMPLE TOPICS FROM ANIMAL ALLIES SEASON

- Chimney Swifts losing their homes
- Training therapy dogs
- K-9 dogs helping the police
- Monitoring bee hives to keep them healthy
- Bears getting into trash cans
- Finding lost dogs
- Preventing Lyme disease from deer ticks
- Helping baby turtles find their way to the ocean
- Cow tagging
- Animals drinking from polluted city water
- Keeping horses hydrated

Identify Think about all the different ways that people interact with animals. Sometimes it happens on purpose and sometimes it happens by accident. Pick a situation when people and animals interact, then identify a specific problem you want to solve.

After you select a problem, find out about the current solutions. Why does this problem still exist? Why aren't the current solutions good enough? What could be improved?

In the ANIMAL ALLIESSM Challenge, an animal is any member of the scientific animal kingdom (besides humans) that is currently alive today.

Sample topics from teams that participated in *FIRST* LEGO League Animal Allies

CREDITS

- This lesson was written by Sanjay and Arvind Seshan
- More lessons available at www.ev3lessons.com and www.flitutorials.com



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