# PROGRAM EVALUATION:
# S.H.E. CAN STEAM SUMMER CAMP

September 2022

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Program Evaluation: S.H.E. Can STEAM Summer Camp (September 2022)

Prepared for the
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All images in the report were taken from https://airandspace.si.edu.

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# RESEARCH GOALS

The Smithsonian's National Air and Space Museum (NASM), contracted Kera Collective (formerly RK&A) to conduct a program evaluation of the 2022 S.H.E. Can STEAM Summer Camp in two locations–Chantilly, Virginia and Springdale, Arkansas. Data were collected from February to August 2022.

## Study Objectives

The program evaluation explored:

- Participants' program experiences when they are at NASM's Steven F. Udvar-Hazy Center and in Arkansas, including:
  - What about the activities or facilitation strategies are most successful in boosting participants confidence in STEAM, interest in aviation, and skills related to self-efficacy;
  - What about the activities or facilitation strategies might be remediated to boost participants confidence in STEAM, interest in aviation, and skills related to self-efficacy;
  - The potential effects of co-ed program experiences on girls and boys.
- The short-term effect (Level 1) and the effect of repeat participation (Level 2) on participants' interest in STEAM, as well as awareness and interest in aviation careers;
- Effective support strategies for maintaining their interest and providing additional opportunities in STEAM and aviation; and
- Opportunities and barriers to expanding the applicant pool.

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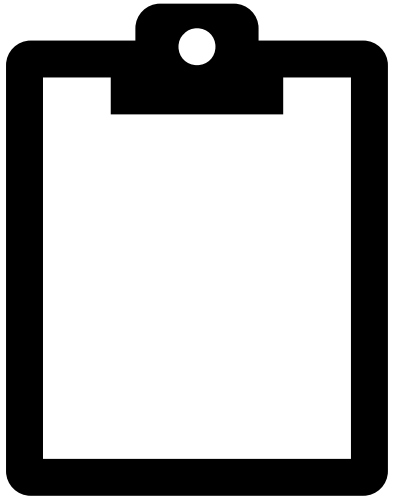
# METHODOLOGY

Kera Collective used **four methods** to collect data about the program from February to August of 2022 during 6 camp sessions. Methods included:



## Ethnographies

A Kera-trained evaluator conducted naturalistic observations of the program at three points in time—beginning, middle, and end—during each of the 6 sessions (18 total). Observations were open-ended and focused on how the program supports participants in building confidence in STEAM and enhancing their interest in aviation.

## Pre- and Post-Survey of Middle-School Participants

NASM staff administered a pre-post survey that Kera developed for previous evaluations of the program (with slight modifications based on current evaluation needs). The survey includes rating statements, multiple choice questions, and short-answer essay questions.

## Survey of Guardians

NASM staff administered a short survey of guardians that was completed on the first day of camp. The survey includes multiple-choice questions and short-answer essay questions.

## Intern Interviews

Kera conducted in-depth interviews with interns who facilitated the program. Interviews were open-ended and focused on the strengths and weaknesses of the program as well as what interns gained from facilitating the program.

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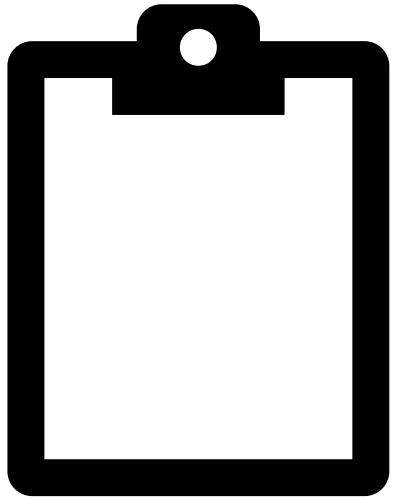
# DATA ANALYSIS AND REPORTING

Kera Collective analyzed and reported qualitative and quantitative data as follows:

## Qualitative

Ethnographies and open-ended short-answer responses from the surveys were analyzed in the qualitative tradition. The evaluators studied the notes and responses for patterns and coded them as they emerged. Data are reported in narrative with excerpts from the notes or responses as appropriate.



## Quantitative

Close-ended survey data were analyzed statistically, including frequency distributions and analysis of variance (ANOVA). Data are presented in:

- **Aggregate** (i.e., % of the overall sample) for guardian surveys (**plum** in charts).
- **By pre/post** for middle school participant surveys—pre in **blue** and post in **orange**. Statistical differences at $p < .01$ are noted.
- **By other variables as notable** (e.g., gender, program level, location, etc. if there are relevant statistical differences at $p < .01$); data are described in text.

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# KEY TAKEAWAYS + IMPLICATIONS

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# TAKEAWAY #1

**Finding**

Participants enjoyed the camp overall, especially unique opportunities like flying, which sparked their interest in STEAM and aviation.

Indicators:

- Ethnographies show many participant exclamations of excitement, especially during flight simulations and discovery flights (e.g., "It was awesome! I felt weightless.")
- Respondents' ratings of their interest in STEAM and aviation increased from pre to post, and their increased interest in aviation was statistically significant (indicating the camp had an impact).
- Two-thirds of respondents were most looking forward to flying (66%), and this expectation was met as the best part of camp for two-thirds of participants (69%).

**Implication**

As in years past, the unique experiences afforded by the camp, such as flying, make a lasting impression on campers and should be continued (or expanded), as they increase interest in aviation.

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# TAKE-AWAY #2

## Finding

Participants increased their awareness of STEAM and aviation careers, especially in terms of the variety and specificity of those careers.

Indicators:

- Respondents named between 0 and 8 careers (median = 3 careers) on the pre-survey and between 0 and 11 careers (median = 5 careers) on the post-survey.
- Respondents' description of STEAM and aviation careers increased in specificity from pre to post (e.g., engineer versus human factor engineer, aviation technician).
- Observations show that the camp supported this increase in awareness through a variety of speaker presentations, including female speakers from SpaceX, the Federal Aviation Administration, and the Aviation Institute of Maintenance.

## Implication

Providing opportunities for participants to hear from female professionals in STEAM and aviation is important for increasing participants' awareness of the variety of potential careers.

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# TAKE-AWAY #3

**Finding**

Participants increased their interest in STEAM- and aviation-related careers, especially those related to aviation and flying.

Indicators:

- Respondents' ratings of their interest in a job that uses STEAM and aviation were higher from pre to post, and they rated their interest in a job that uses aviation the highest (post mean rating = 8.8).
- Respondents' curiosities about STEAM and aviation careers increased in specificity from pre to post, especially questions about how to pursue a career (e.g., educational requirements).
- Observations show that many speakers provided encouragement and named specific ways participants could pursue STEAM and aviation careers, and participants also asked speakers questions about how to pursue careers in aviation (e.g., "How do you become a flight student?").

**Implication**

Having speakers emphasize how they developed and pursued their interest in a particular STEAM and aviation career is important for enhancing participants' interests in these careers. Pairing hands-on experiences like flying or riveting with speaker presentations is also effective (rather than lectures).

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# TAKEAWAY #4

## Finding

Gender was not a prevalent factor in study findings (as most participants were female). However, male participants did differ slightly in their career interests.

Indicators:

- Most (90%) of participants identify as female. One-half of the camp sessions had a few males.
- Male participants are more likely to be interested in a job that uses aviation or science.

## Implication

As in past years, the impact of having male and female participants together does not seem to have a significant impact on the camp experience (though the sample of male participants may be too small).

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# TAKE-AWAY #5

**Finding**

Facilitators employed many effective strategies for helping participants build their confidence and interest in STEAM and aviation.

Indicators:

- Ethnographies show many examples where facilitators:
  - used real-world examples and analogies to help bridge participants' understanding
  - normalized failure as an important part of learning, and
  - encouraged critical thinking about the "why" of participants' success and failures.
- Ethnographies also show many examples where participants brainstormed ideas, used trial and error, and expressed joy after overcoming challenges, often encouraged by facilitators.

**Implication**

As much as possible, facilitators should consistently employ these strategies, as it seems to have influenced participants' confidence in their ability to be successful in STEAM and aviation.

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# TAKE-AWAY #6

**Finding**

Participants' primary suggestions for how NASM can support their future pursuits in STEAM and aviation were about building awareness of opportunities.

Indicators:

- Some respondents suggested regular e-mail communications about STEAM and aviation opportunities (including how to register and apply).
- Some respondents also suggested that NASM have a resource list on their website (possibly searchable) that participants could access for STEAM and aviation opportunities.
- A few also hoped for support from NASM staff if they had questions about their application to certain programs (i.e., how to successfully apply).

**Implication**

NASM should consider choosing one way to follow up with participants post-camp experience so that they can support their continued exploration of STEAM and aviation (e.g., monthly newsletter).

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# TAKE-AWAY #7

## Finding

Barriers to participants' engagement ranged from those within NASM's control (e.g., types of activities, level of support/instruction) to those outside of NASM's control (e.g., weather, personal dynamics).

Indicators:

- Ethnographies showed some negative personal interactions between participants, which interns echoed in their interviews as being a challenging aspect of facilitating the camp.
- Ethnographies showed that participants encountered some challenges with hands-on activities (e.g., building gliders, mars rover, egg drop), and some respondents also described these activities as boring or frustrating due to lack of instructions or because what they built did not work.
- Some participants and interns said scheduling changes were challenging (e.g., delayed activities due to weather), and interns said they did not always have adequate back-up plans in place.
- A few transportation barriers were noted during ethnographies (e.g., family without a car).

## Implication

While NASM cannot control the weather or personality conflicts, interns did suggest providing more back-up activity options for when extenuating circumstances occur.

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# ETHNOGRAPHIES

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# DAYS AND ACTIVITIES OBSERVED

Kera Collective observed 6 camp sessions from February to August 2022. Observations took place in two locations—Springdale, Arkansas and Chantilly, Virginia. Each session was observed 3 times—at the beginning, middle, and end of camp (18 total observations).

**Chantilly, VA: February 2022 (Level 2)**

**2/5:** Guest Speaker (Major Brittany Trimble), Flight Simulator, Zip Line design

**2/19:** Propeller Test, Flight Simulators, Raspberry Pi, Rocket + Glider Build, Restoration Hangar Tour

**2/26:** Raspberry Pi, Flight Simulators, Glider Build

**Springdale, AR: March 2022 (Level 1)**

**3/19**: Crew Return Module, Egg Drop, Paper Airplane, Flight Simulator

**3/23:** Guest Speaker (99s), Map Observation, Glider Build, Goose Chase Online Scavenger Hunt

**3/26:** Discovery Flights, Riveter Binders, Rocket Launch

**Chantilly, VA: April 2022 (Level 1)**

**4/2:** Guest Speaker (Pilot Laura Savino), Flight Simulator

**4/9:** Discovery Flights, Riveter Binders

**4/23:** Flight Simulators, Logo Design, Drone Build + Program, Smart Skies / Plane Spotting, Balloon Prep

**Springdale, AR: June 2022 (Level 1)**

**6/15**: People Bingo, Guest Speaker (SpaceX engineer), Egg Drop, Center of Gravity, Women in STEM

**6/21:** Flight Simulator, Glider Build

**6/27:** Balloon Prep + Launch, Crystal Bridges field trip + art making

**Chantilly, VA: July 2022 (Level 1)**

**6/29:** Zipline, Guest Speaker (FAA), Flight Simulators, Glider Build, Stability + Control

**7/6:** Logo Design, Rocket Build + Launch

**7/11:** Discovery Flights, Crew Return Module

**Chantilly, VA: August 2022 (Level 1)**

**8/1:** Guest Speaker (SpaceX), Egg Drop

**8/5:** Flight Simulators, People Bingo, Discovery Flights, Glider Build/Launch

**8/11:** Flight Simulators, Logo Design, Drone Build + Program, AIM Tour

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# PARTICIPANT CHARACTERISTICS

Most sessions were of first-time (Level 1) participants. The number of participants in each session ranged from 11 to 36 participants. Overall, most participants observed were female; one-half of the sessions each had a few male participants.

**Chantilly, VA: February 2022 (Level 2)**

# of participants: 11 to 28 (range)
Females: 9 to 26 (range)
Males: 2

**Springdale, AR: March 2022 (Level 1)**

# of participants: 21
Females: 17
Males: 4

**Chantilly, VA: April 2022 (Level 1)**

# of participants: 29
Females: 29
Males: None

**Springdale, AR: June 2022 (Level 1)**

# of participants: 32
Females: 29
Males: None
Other: 3

**Chantilly, VA: July 2022 (Level 1)**

# of participants: 22 to 23 (range)
Females: 22 to 23 (range)
Males: None

**Chantilly, VA: August 2022 (Level 1)**

# of participants: 32 to 36 (range)
Females: 29 to 33 (range)
Males: 3

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# STEAM CONFIDENCE BUILDING

Observations show that participants were exposed to a variety of STEAM activities and female speakers with STEAM + aviation careers (e.g., pilots, airplane technicians, aerospace engineers).

STEAM activities ranged from flight simulations to building a glider to designing a zip line. Facilitators were observed providing support to participants in a variety of ways, including:

- **Real-world application:** Facilitators offered one-on-one support using real-world examples and analogies to help bridge participants' understanding (see example).
- **Normalizing failure:** Facilitators verbalized that it was okay to fail and encouraged participants to try again (e.g., "You might crash and fail. It is alright. We will just reset the simulators and you will try again.")
- **Posing questions:** Facilitators posed questions to help participants think critically about the materials they were using and to help them think through next steps (see example).
- **Reflecting:** Facilitators often asked participants reflection questions to help them understand what worked and why (see example).

**Real-world application**

P: "I don't know how to get back up."

F: "You use your throttle. Remember, you are moving in three directions. Trying to go up without throttle is like trying to climb a hill with no engine."

**Posing questions**

F: "What are you going to do if the first design doesn't work?"

P: "Replace the parachute with a balloon."

F: "I love that. That's what engineers do—prepare for what could go wrong."

**Reflecting**

F: "What did you notice as you were testing the gliders?"

P: "When you throw, you need a loose grip."

F: "Okay, so [the effect of] drag."

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# STEAM CONFIDENCE BUILDING

Female speakers shared how they developed an interest in aviation and how they turned that interest into a career despite potential challenges.

- **Discussing support and mentorship:** Speakers highlighted ways they sought support and mentors to help guide them in their interest and careers (see example).
- **Suggesting learning opportunities and pathways:** Speakers offered encouragement to participants by suggesting career pathways (e.g., "United just announced a program to support women training as pilots") and additional STEAM opportunities that participants could do to gain more experience (see example).
- **Making goals seem attainable:** Speakers provided encouragement to help participants see that their STEAM and aviation goals are realistic and attainable (see example).

**Support and mentorship**

P: "How did you find a mentor?"

S: "I Googled 'female fighter pilot' and found a website with a contact that I emailed, and someone replied to me."

**STEAM learning opportunities**

S: "If you are interested in aviation, we partner with Prince William County Public High school with courses that we teach."

**Attainable goals**

S: "I have a 13-year-old student who is a natural at controlling the plane. So, you all can totally be a student now. You'll be the youngest class of pilots coming up."

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# STEAM CONFIDENCE BUILDING

Participants also exhibited confidence in their skills during activities in a variety of ways, including:

- **Trial and error:** Participants often tried alternative methods when they made mistakes, or their first attempt failed.
- **Overcoming challenges:** Participants evolved from expressing doubt to feeling confident in their ability to do or try something, especially flying.
- **Brainstorming:** Participants often collaborated with partners to brainstorm ideas about which strategies would work best (see example).
- **Expressing pride:** Participants expressed pride and joy when they accomplished something (e.g., P: "I landed it! I'm the greatest drone pilot in all the world!").

**Trial and error**

P: "Oh no, I cut all the way through. What should I do? Masking tape burns, duct tape melts; oh, here's electrical tape!"

F: "Great job!"

**Overcoming challenges**

P: "When he [the pilot] gave me the yoke to take off, he just leaned back and crossed his arms, and I was like 'Oh my God' but he had so much confidence that I wouldn't crash. I would definitely take lessons with him; he's awesome."

**Brainstorming**

P1: "Can we look at the fabric? It doesn't look like air would flow through it because I can't feel my breath."

P2: "Would wax paper work?"

P1: "You couldn't breathe through that either, and it's too light."

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# DEVELOPING INTEREST IN AVIATION

Participants demonstrated an interest in aviation in a variety of ways, including during activities and presentations.

- **Interest in aviation careers:** Many participants asked speakers questions about how to pursue careers in aviation (e.g., "How do you become a flight student?" and "What's the average age of your students?").
- **Expressing excitement and joy:** During activities, participants often demonstrated excitement, especially during flight simulations and discovery flights (see example).
- **Interest in future STEAM opportunities:** Some participants also asked about additional activities and opportunities they could pursue (e.g., "Can we come back to this camp in June? Will you tell us when you have a Level 2?").
- **Curiosity about STEAM content:** Participants often asked questions about things they observed during STEAM activities, demonstrating curiosity (see example).

**Excitement and joy**

F: "How was flying?"

P1: "That sound [plane taking off] is music to my ears"

P2: "It was awesome. I felt weightless."

**Curiosity about STEAM topics**

P: "Why is the balloon shiny?"

F: "Because its mylar."

P: "Can it protect from heat?"

F: "Yes, it can do that!"

# CO-ED EXPERIENCES

Most participants identify as female; however, a few males participated in about one-half of the camp sessions.

- **Male-male interactions:** Male participants tended to pair up or choose groups with other male participants, and this did not change during the duration of camp.
- **Male-female interactions:** A few male and female participants were observed providing each other with help and working together during activities. For instance, a male and female participant worked together to create the Riveting Binders.

# BARRIERS

A few barriers to participants' interest and engagement were noted during observations, including:

- **Physical discomfort:** Some participants were physically uncomfortable with certain activities like flying (e.g., motion sickness, fear of heights) (see example).
- **Unsuccessful activities:** Some participants expressed frustration when they could not successfully complete an activity, particularly the gliders and paper airplanes (see example).
- **Transportation:** Observers noted that facilitators had learned of a few participants who had difficulties getting to camp (e.g., family did not have a car).
- **Interpersonal interactions:** Some participants had difficulty working together and gave each other negative feedback, which slowed down their progress during activities.

**Physical Discomfort**

F: "How was flying?"

P: "I am surprised I did not vomit."

P: "I don't really want to go again."

**Unsuccessful activities**

P: "This is making me so angry! The whole project! It's just so frustrating. It just broke!"

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# MIDDLE-SCHOOL PARTICIPANT SURVEY

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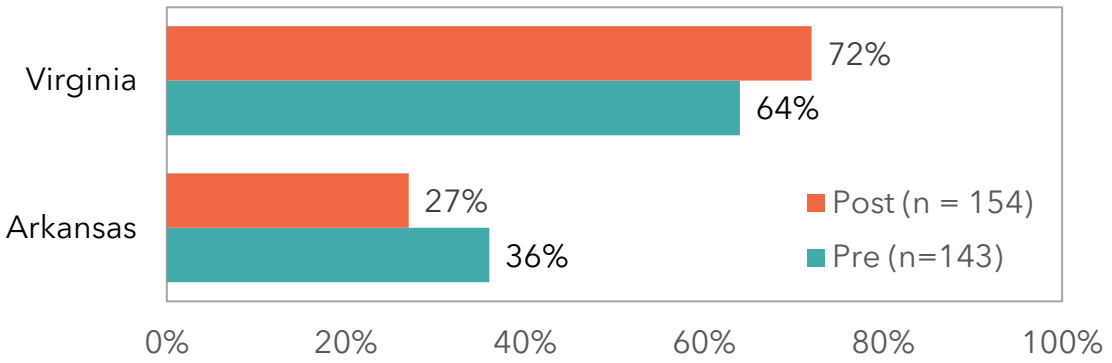
# LOCATION & LEVEL

NASM staff administered a survey to participants before and after their camp participation at all 6 sessions.[1] NASM collected a total of 143 pre-surveys and 154 post-surveys.

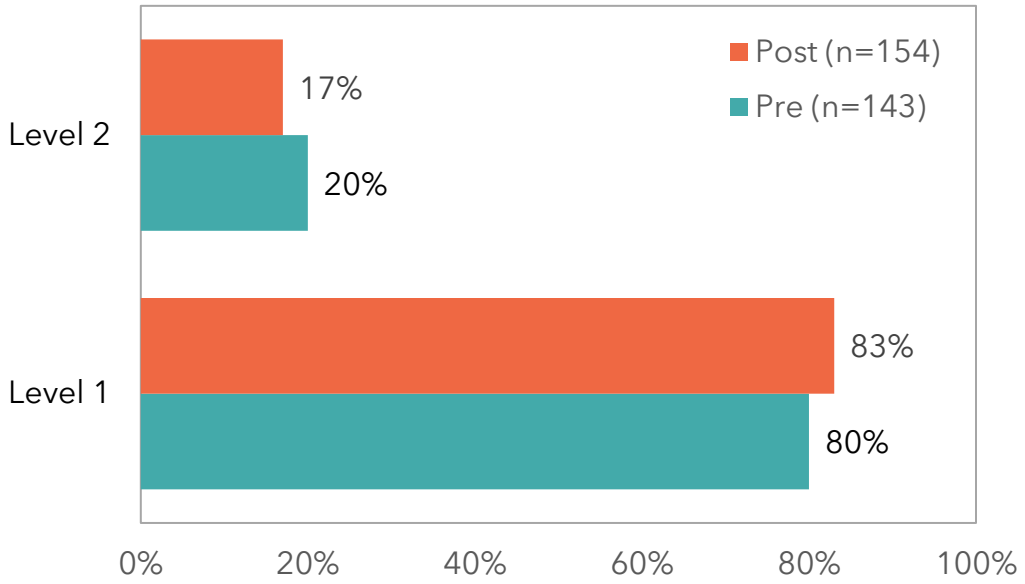
Two-thirds of respondents attended camp at the Chantilly, Virginia location (64% pre and 72% post, respectively).

**Camp Location**




Most respondents were attending the camp for the first time (Level 1) (80% pre and 83% post, respectively).

**Camp Level**




[1]Pre-surveys were not collected at the first summer session in Virginia (July 2022) due to extenuating circumstances.

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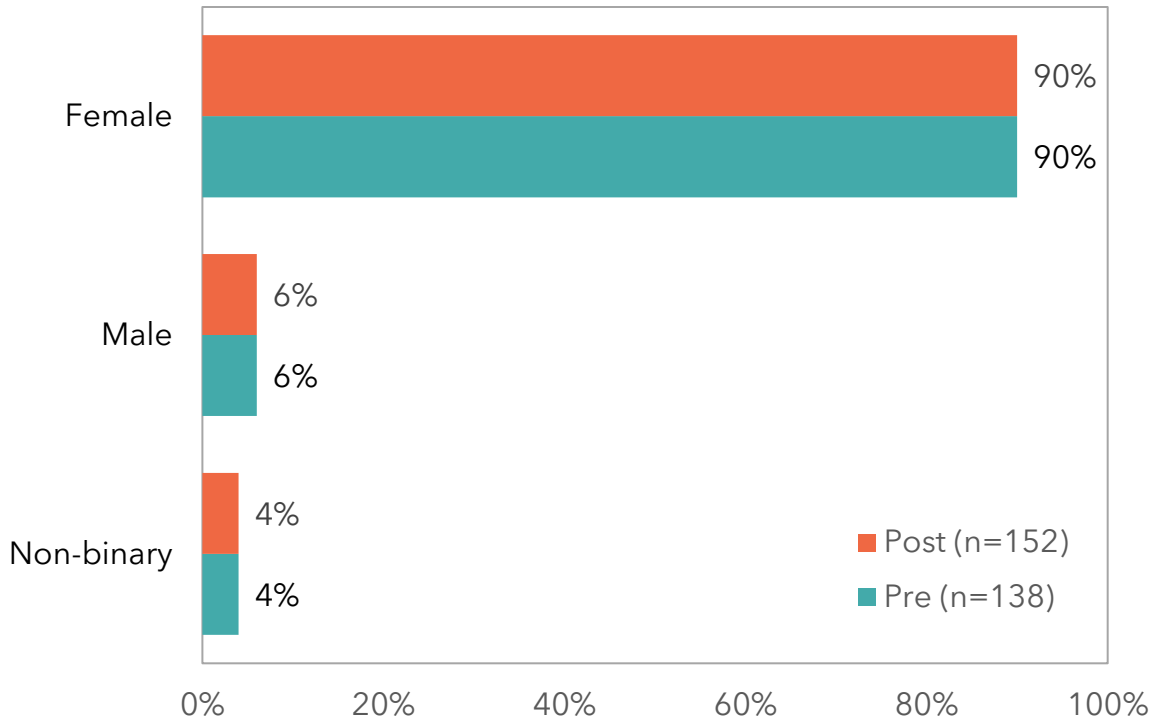
# GENDER

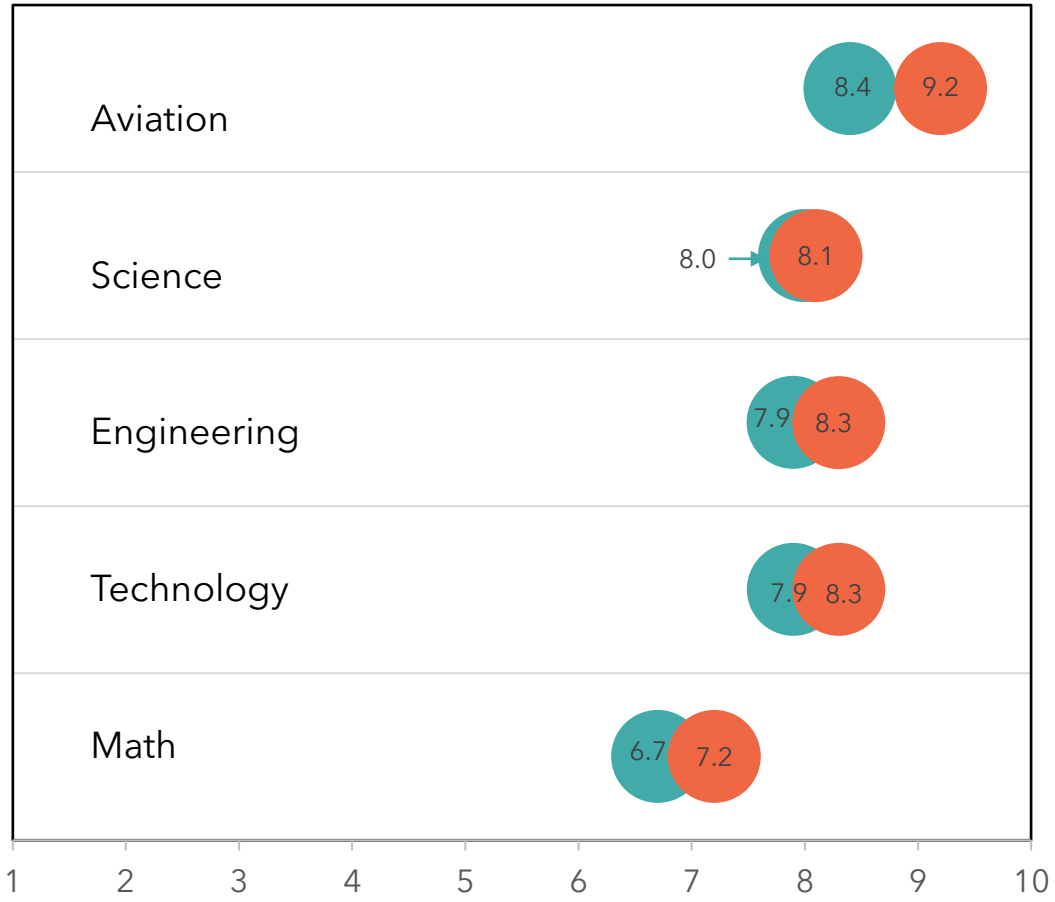
**What is your gender? (n=342)**




Most respondents identify as female (90% pre and post).

# STEAM INTEREST RATINGS PRE/POST

**On a scale from 1 to 10, where 1 is "I do not like it at all" and 7 is "I like it a lot", how much do you usually like …**




Respondents rated their interest in aviation the highest (post mean rating = 9.2). Respondents rated their interest in math the lowest (post mean rating = 7.2).

**Significant findings**

Overall, respondents' mean ratings of their interest in STEAM and aviation topics were higher on the post-survey. However, only one statistically significant difference was found:

- Respondents are more likely to be interested in aviation **after attending camp**.

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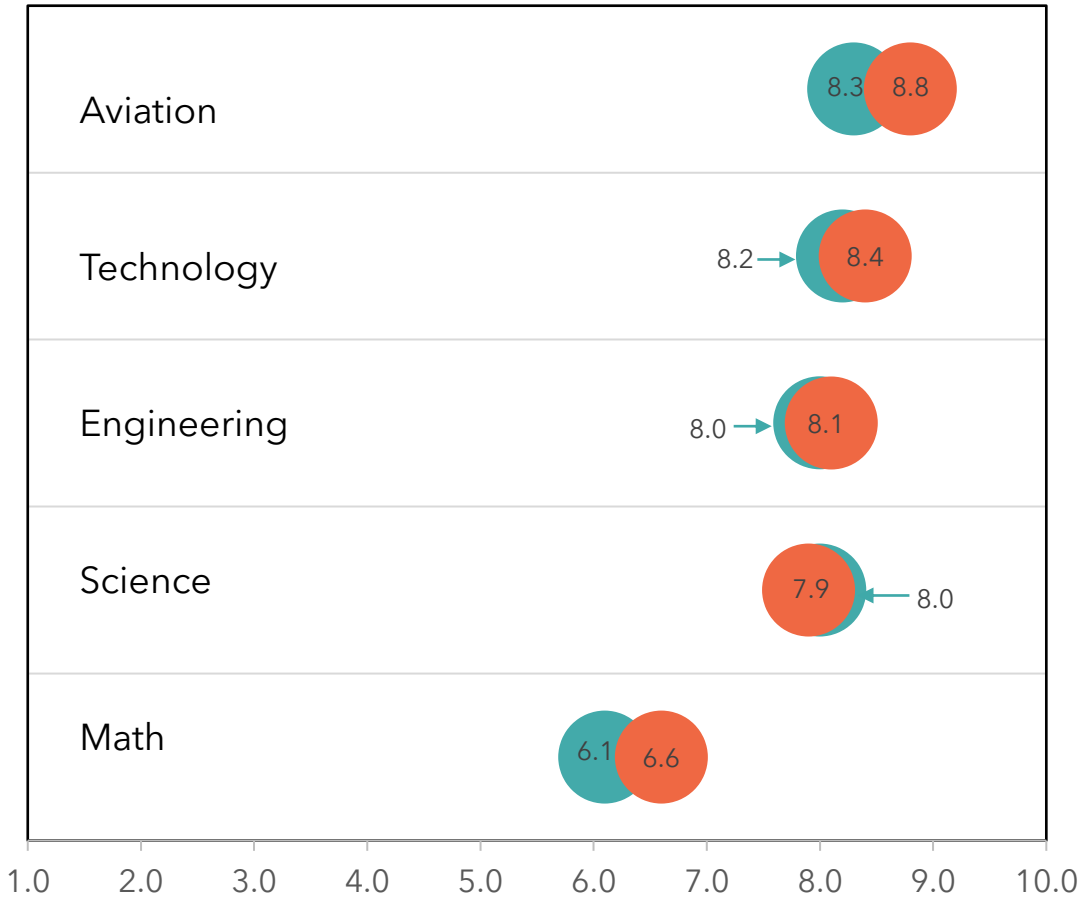
# STEAM CAREER INTEREST RATINGS PRE/POST

**On a scale from 1 to 10, where 1 is "Not interested at all" and 7 is "Very interested", how interested are you in having a job that uses…"**




Respondents rated their interest in a job that uses aviation the highest (post mean rating = 8.8). Respondents rated their interest in a job that uses math the lowest (post mean rating = 6.6).

**Significant findings**

Most respondents' mean ratings of their interest in a job that uses STEAM and aviation topics were higher on the post-survey. However, there were no statistically significant findings.

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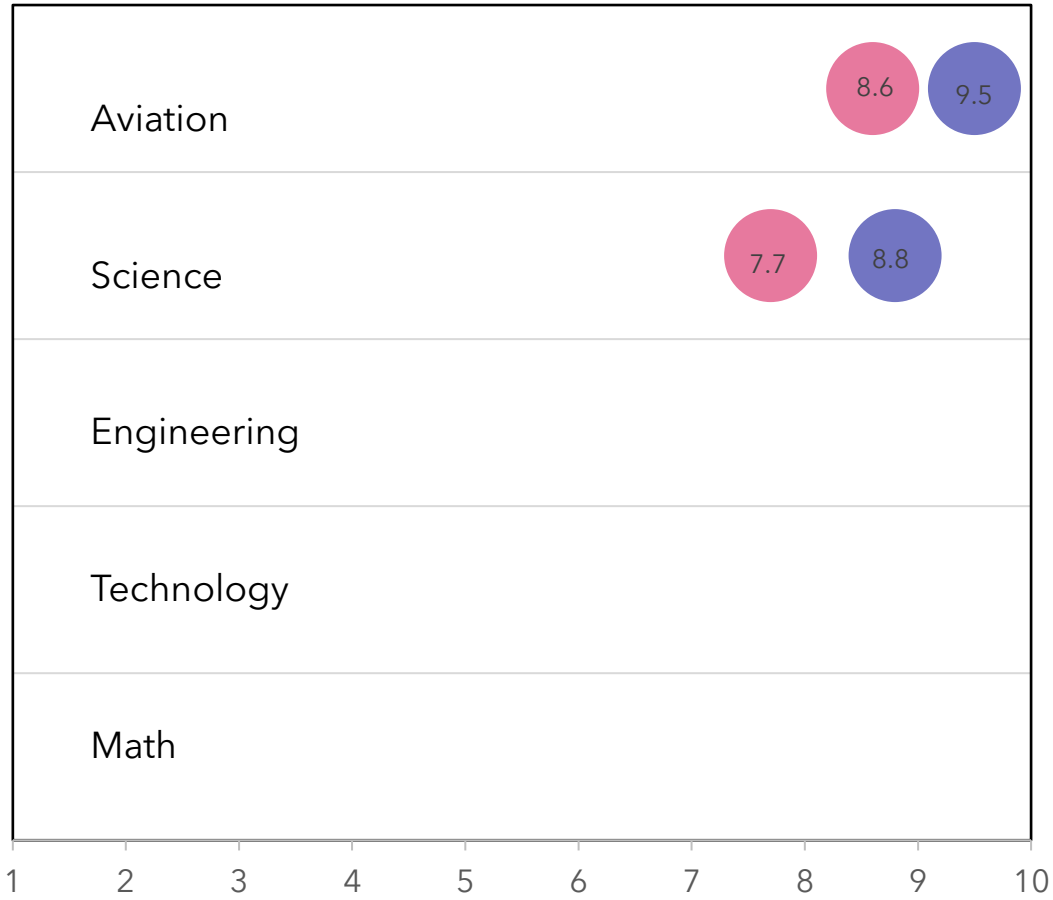
# DIFFERENCES IN STEAM CAREER INTERESTS BY LOCATION

**On a scale from 1 to 10, where 1 is "Not interested at all" and 7 is "Very interested", how interested are you in having a job that uses…"**




**Significant findings**

The **purple bubble** shows the mean ratings for Arkansas and the **pink bubble** shows the mean ratings for Virginia.

- Those who attended camp in **Arkansas** are more likely to be interested in a job that uses aviation.
- Those who attended camp in **Arkansas** are more likely to be interested in a job that uses science.

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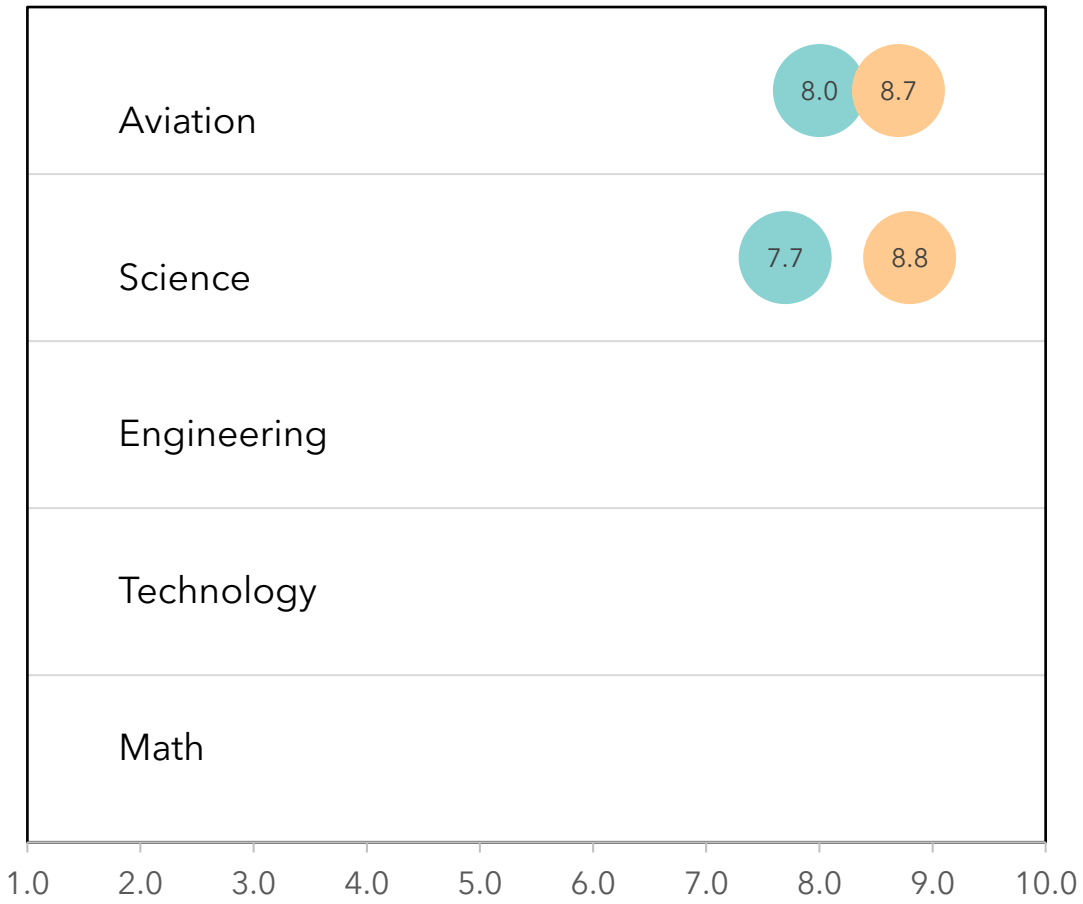
# DIFFERENCES IN STEAM CAREER INTERESTS BY GENDER

**On a scale from 1 to 10, where 1 is "Not interested at all" and 7 is "Very interested", how interested are you in having a job that uses…"**




**Significant findings**

The **orange bubble** shows the mean ratings for males and the **teal bubble** shows the mean ratings for females.

- **Male participants** are more likely to be interested in a job that uses aviation.
- **Male participants** are more likely to be interested in a job that uses science.

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# SKILLS RATINGS PRE/POST

**On a scale from 1 to 10, where 1 is "Not comfortable at all" and 7 is "Very comfortable", how comfortable do you feel when…"**


Respondents were most comfortable with "experimenting to figure out how something works" (post mean rating = 8.8) and "learning new ideas or concepts" (post mean rating = 8.7).

Respondents were least comfortable with "asking questions" (post mean rating = 7.7) and "asking for help" (post mean rating = 7.8).

**Significant findings**
Respondents' mean ratings of their comfort level with certain skills were higher on the post-survey. However, there were no statistically significant findings.

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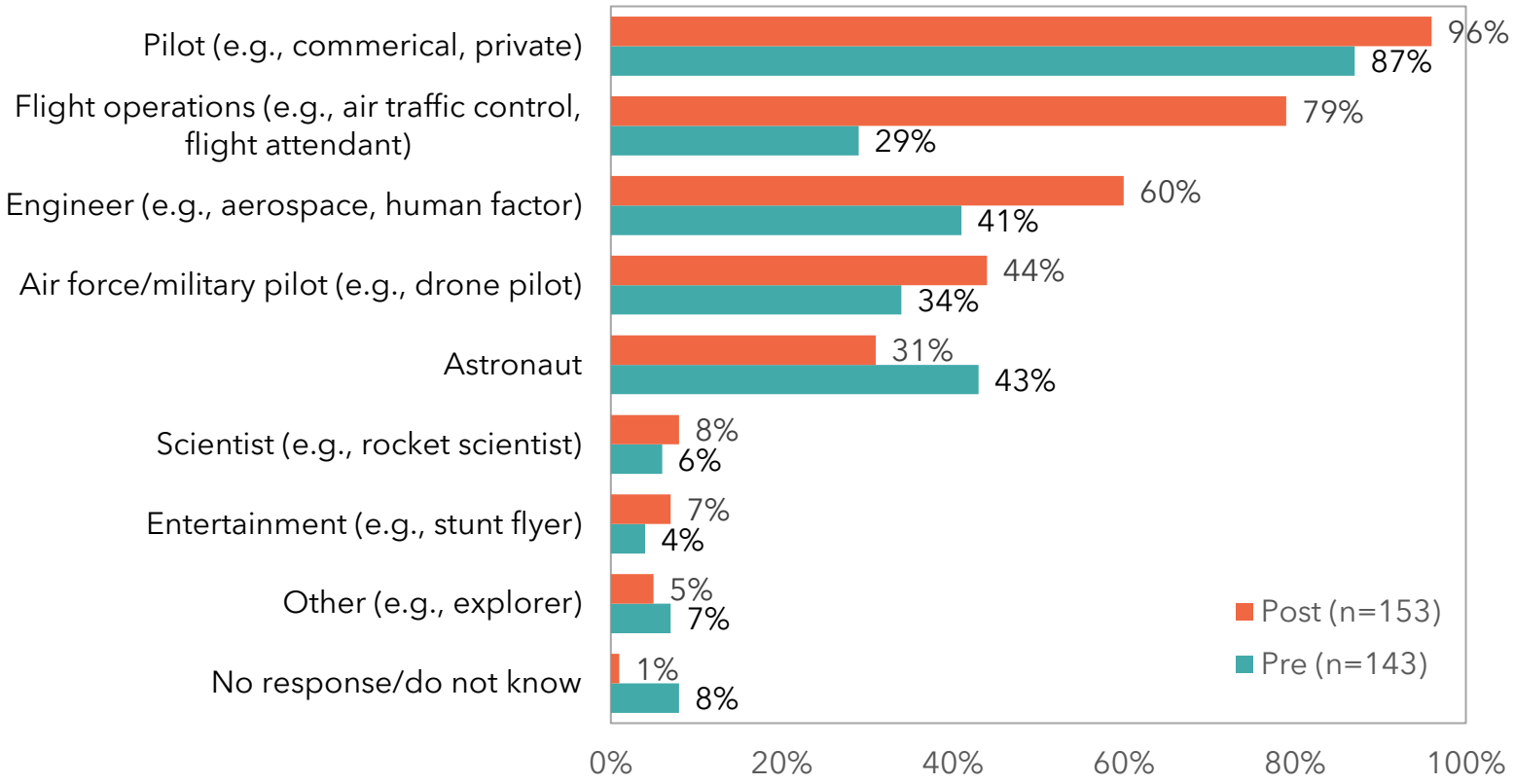
# KNOWLEDGE OF AVIATION CAREERS

**Please list all the aviation-related careers you know about.**
Responses do not total 100% since respondents could list more than one career.




Respondents named between 0 and 8 careers (median = 3 careers) on the pre-survey and between 0 and 11 careers (median = 5 careers) on the post-survey. The mention of most careers increased from pre to post and became more specific (e.g., engineer versus human factor engineer).

The most-frequently mentioned careers were pilot and those having to do with flight operations (e.g., air traffic control).

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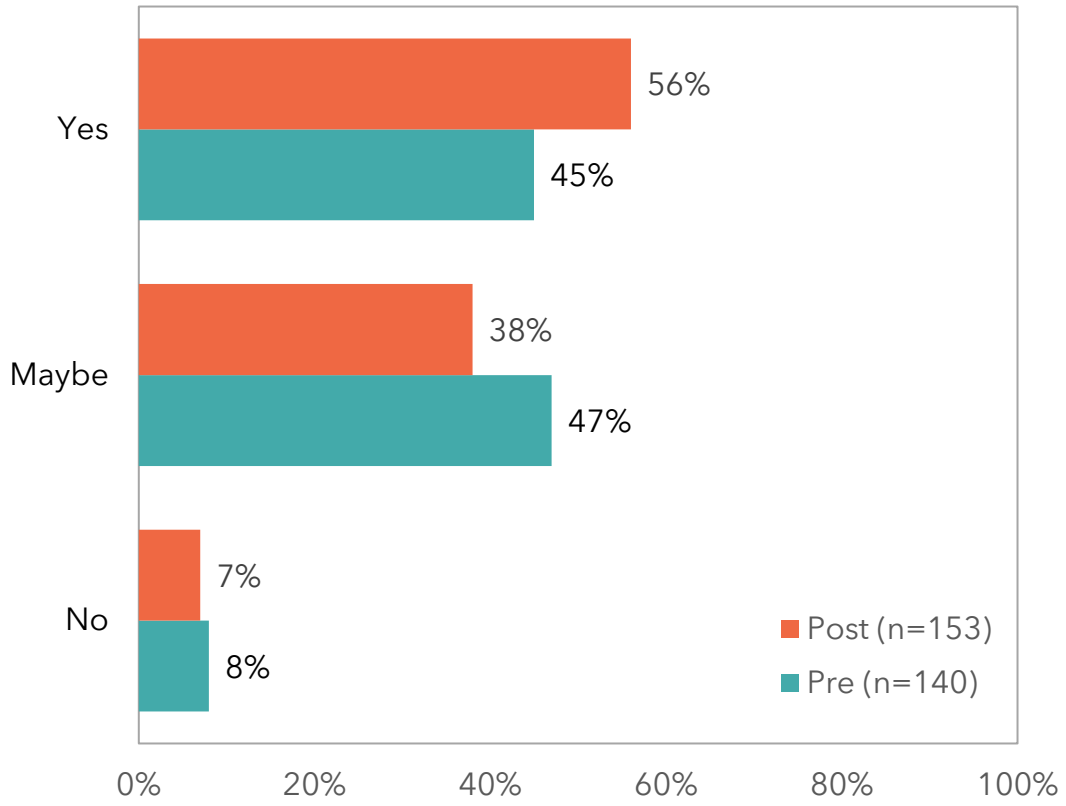
# INTEREST IN AVIATION CAREERS MENTIONED

**Are you interested in pursuing any of the careers you just mentioned?**




About one-half of respondents were interested in pursuing at least one of the aviation careers they listed (56% of post-survey).

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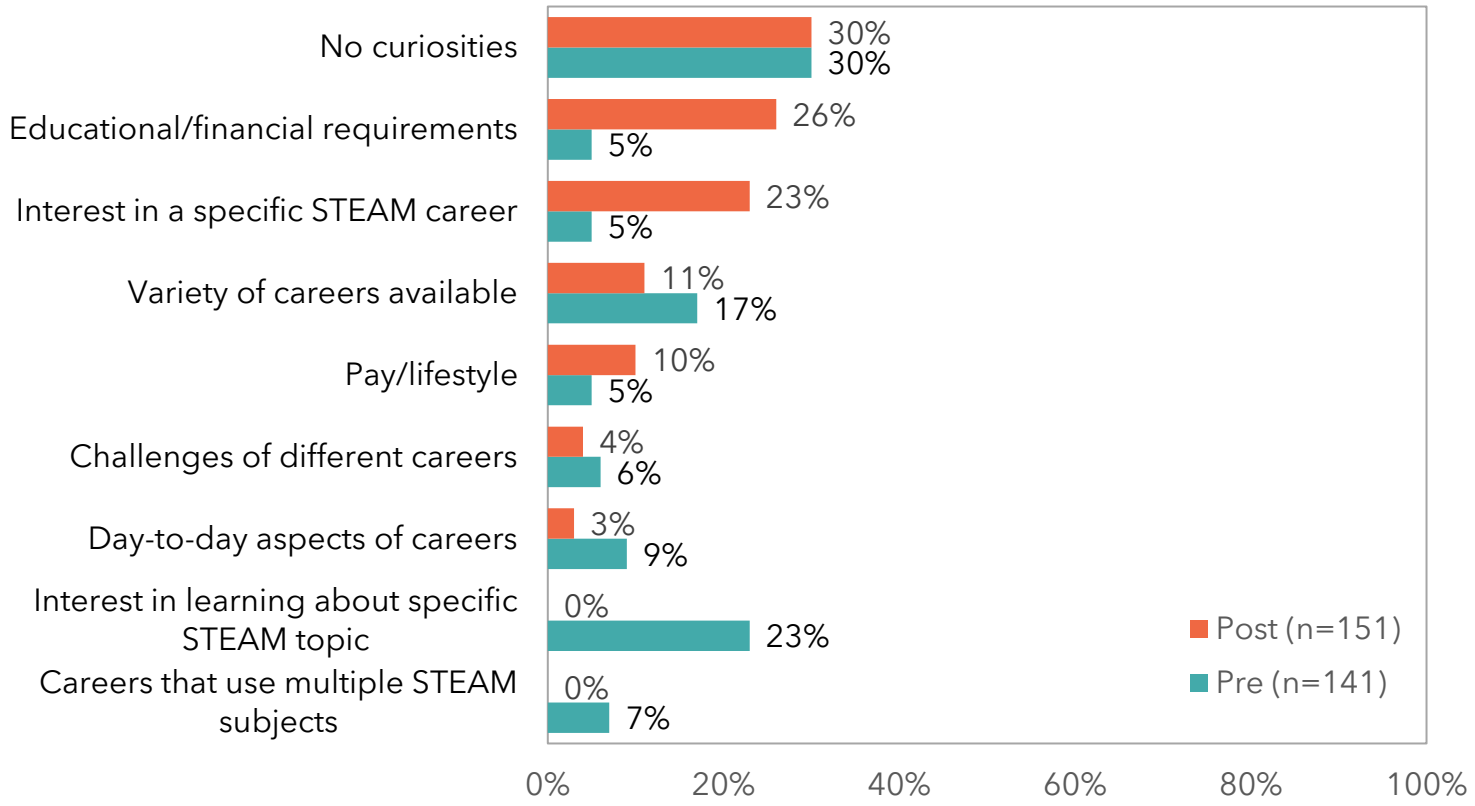
# CURIOSITIES ABOUT STEAM AND AVIATION CAREERS

**What curiosities do you have about aviation and STEAM careers?**
Responses do not total 100% since respondents listed more than one curiosity.




One-third of pre- and post-respondents had no curiosities (30%). Respondents' top curiosities about aviation and STEAM careers were:

- the cost and educational requirements to pursue a career (26%); and
- specific details about what you do in a specific career (23%).

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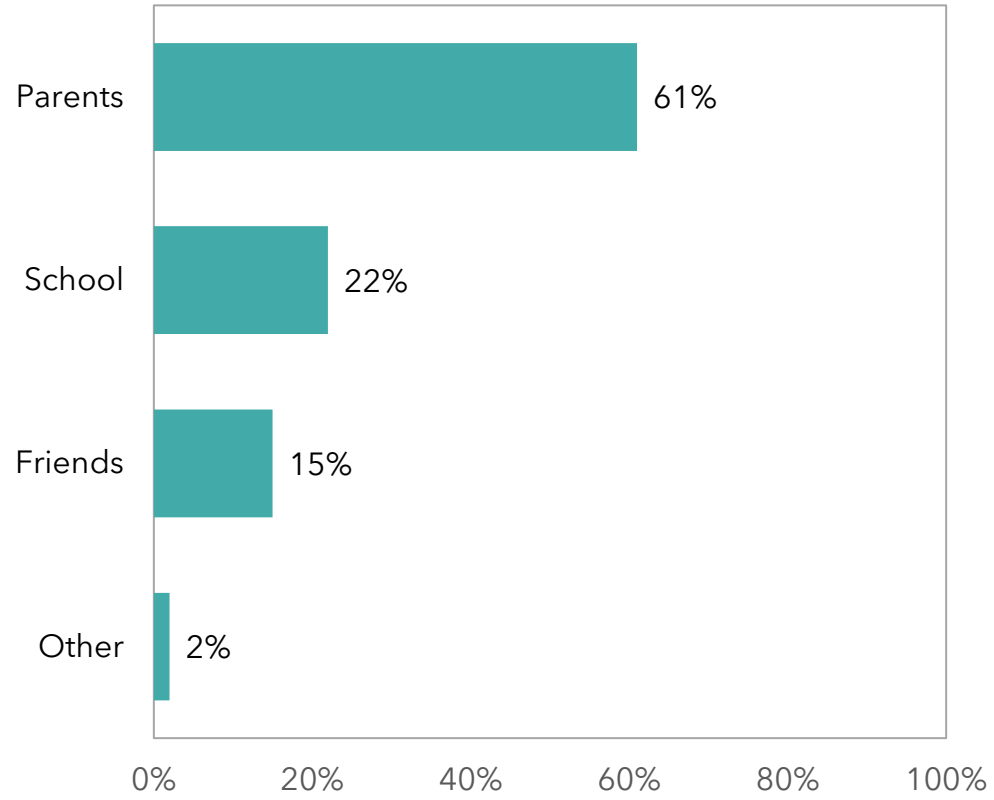
# AWARENESS OF CAMP (LEVEL I ONLY)

**How did you first hear about this camp? (n=108)**
Responses do not total 100% since some respondents selected more than one response.




About two-thirds of Level 1 respondents first heard about the camp from their parent or guardian (61%). One-fifth heard about the camp from their school (22%).

*Other: Girl scouts, sorority

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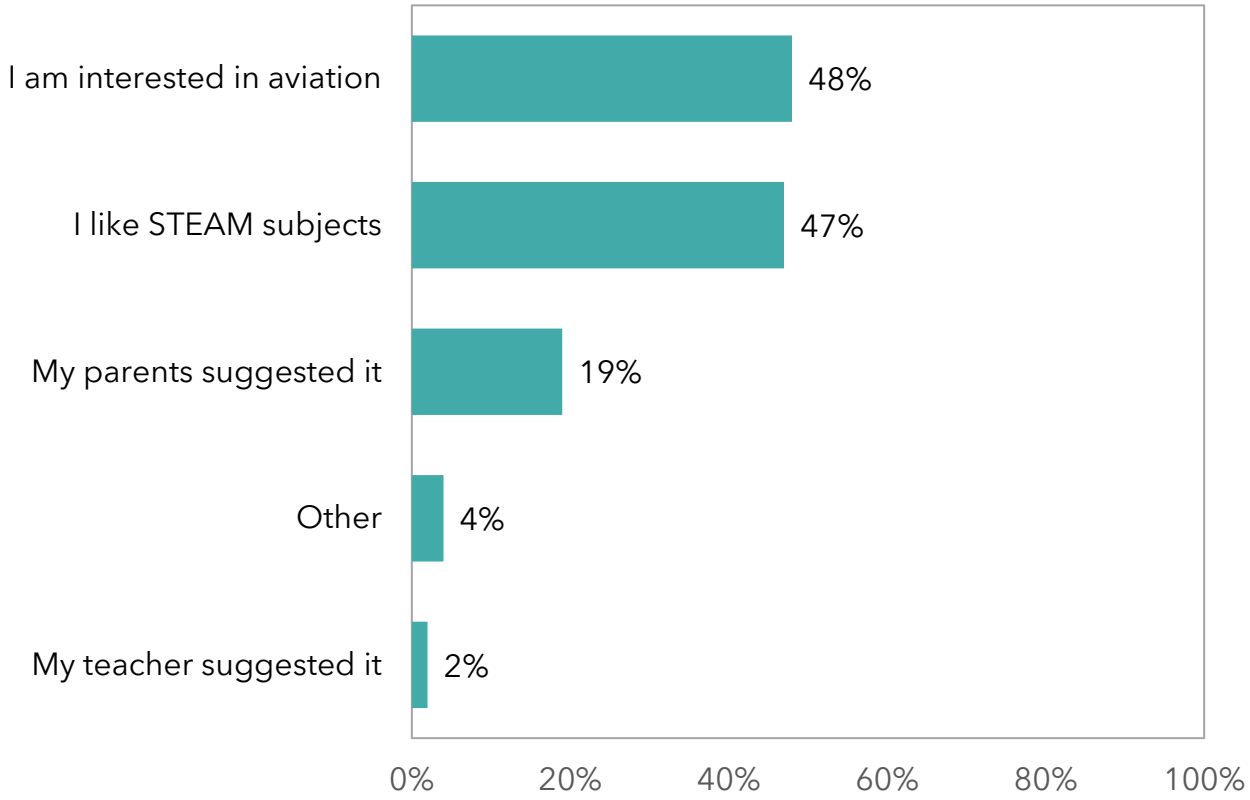
# MOTIVATION FOR APPLYING

**What made you want to apply? (n=140)**
Responses do not total 100% since some respondents selected more than one response.




About one-half of respondents were motivated to participate because of an interest in aviation (48%), and another one-half were motivated to participate because of an interest in STEAM subjects (47%).

*Other: Find a career interest, like hands-on activities, cousin recommended, conquer fears

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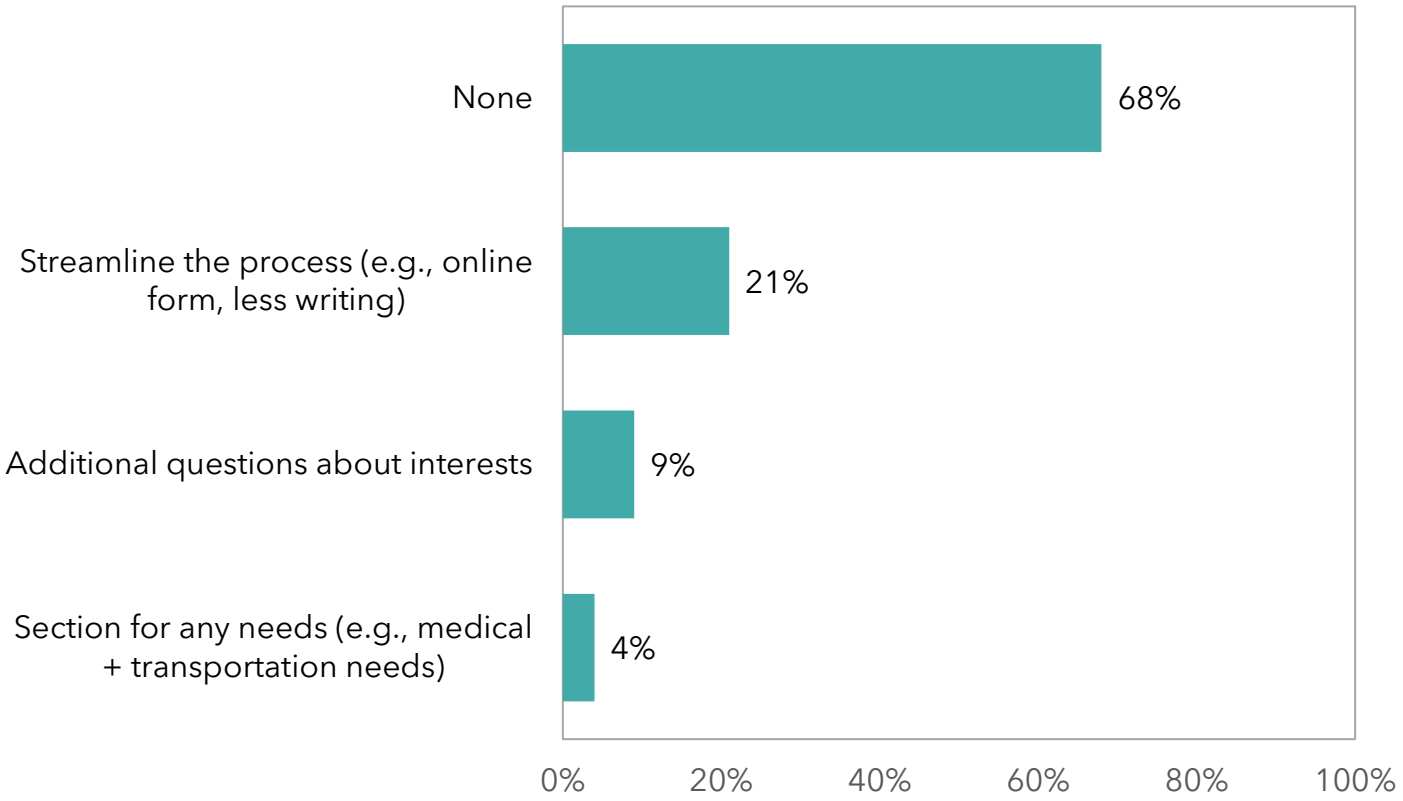
# APPLICATION SUGGESTIONS

**What suggestions do you have for making the application process better for participants like you? (n=140)**




About two-thirds of respondents had no suggestions (68%). One-fifth had suggestions for streamlining the application, such as requiring less writing or creating an online application (21%).

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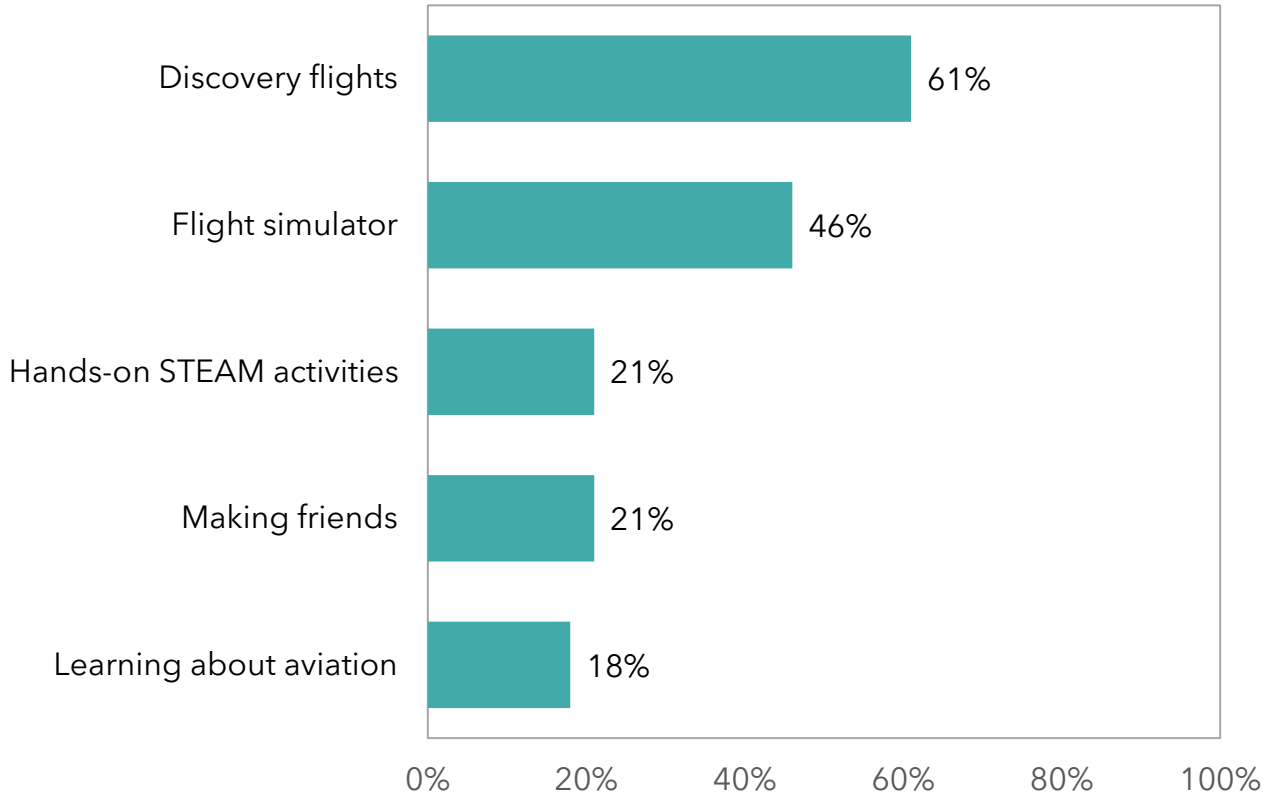
# BEST PART OF LEVEL 1 CAMP (LEVEL 2 ONLY)

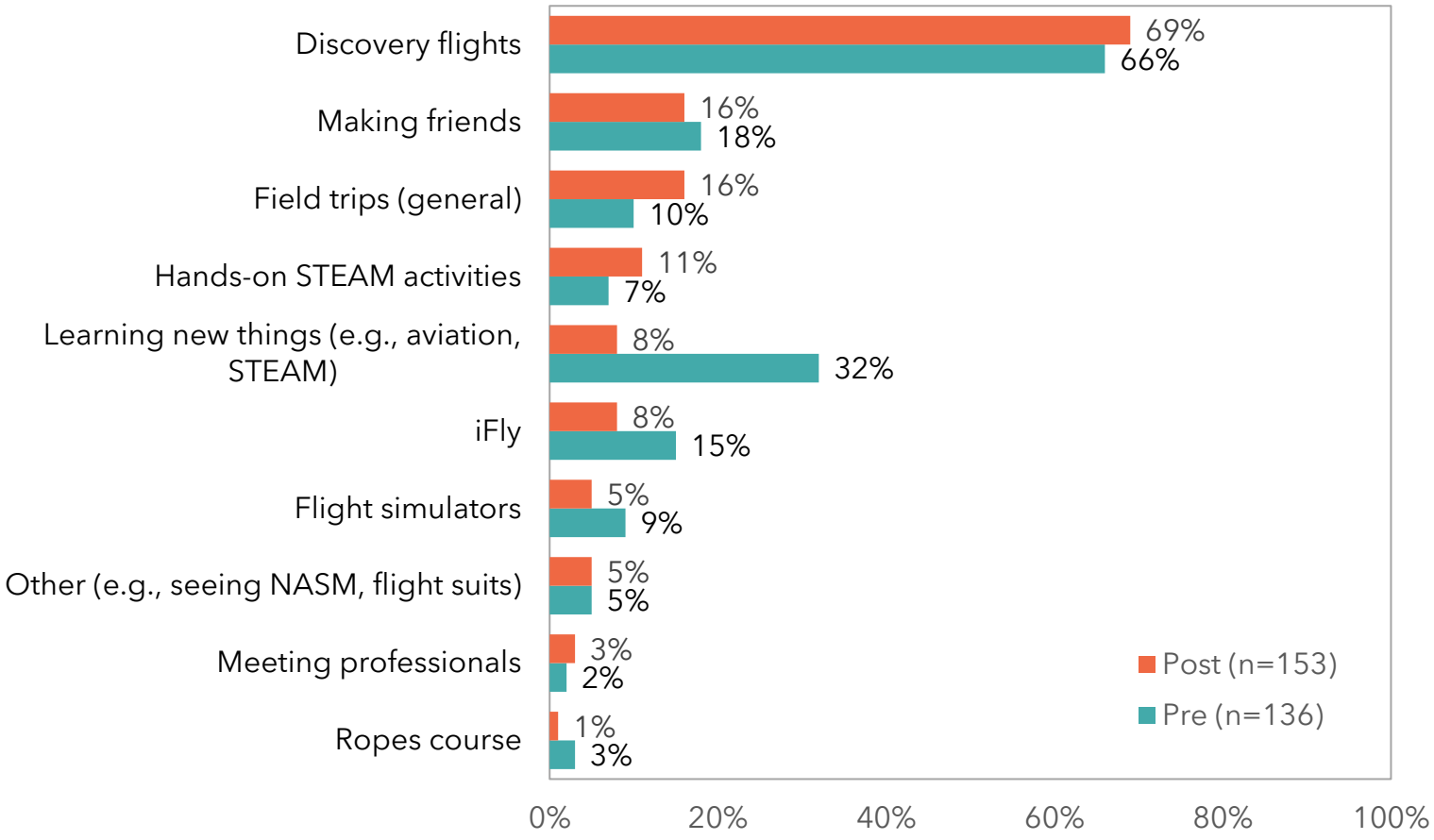
**What did you enjoy most about participating in camp last time? (n=28)**
Responses do not total 100% since some respondents gave more than one response.




About two-thirds of respondents most enjoyed flying (61%), and about one-half also enjoyed the flight simulator (46%).

# BEST PART OF 2022 CAMP

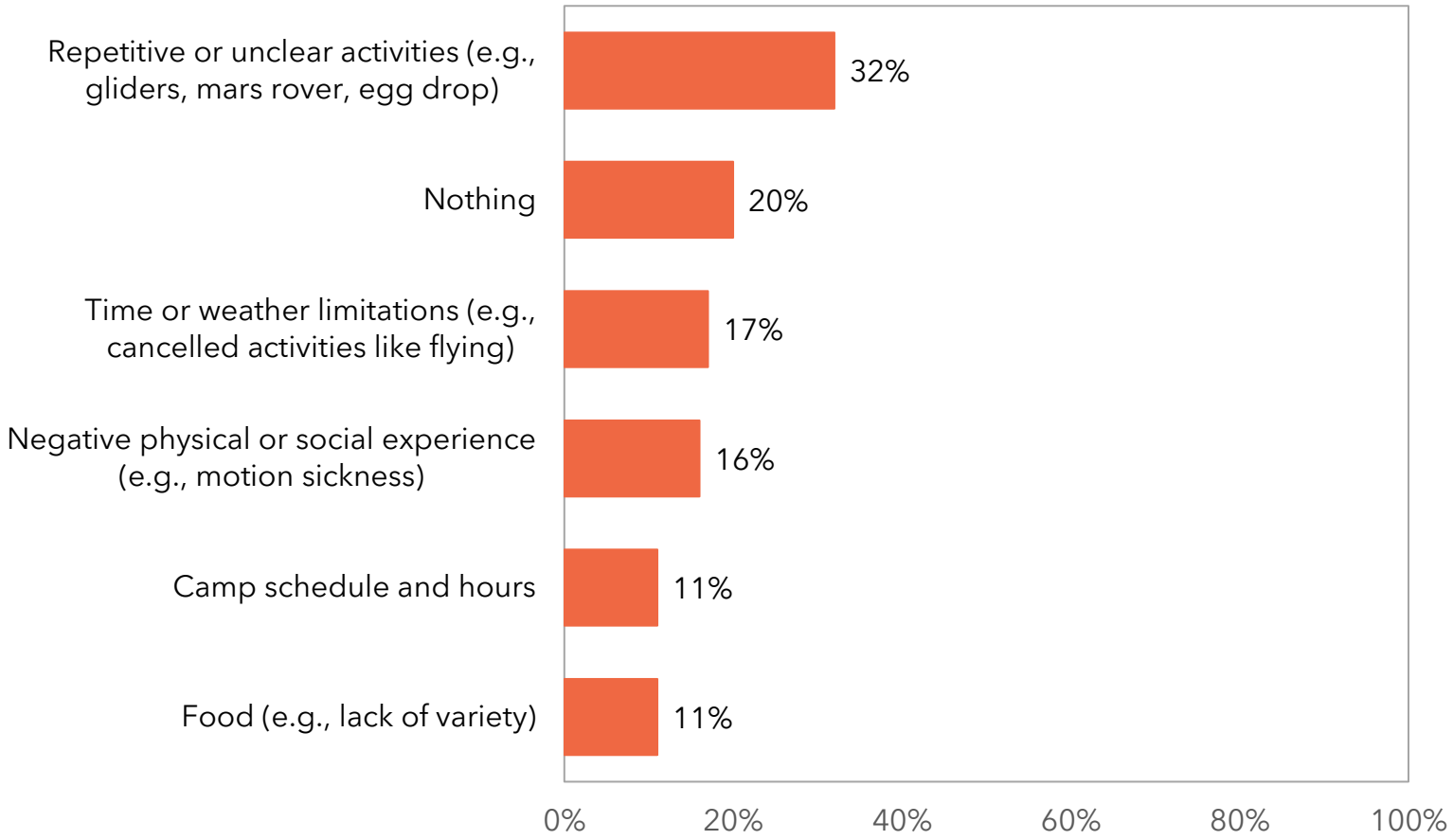
**What are you most looking forward to about the camp (and what would you tell your friend was the best part of camp)?**




About two-thirds of respondents were most looking forward to flying (66%) and this expectation was met as the best part of camp for two-thirds of participants (69%).

# WORST PART OF CAMP

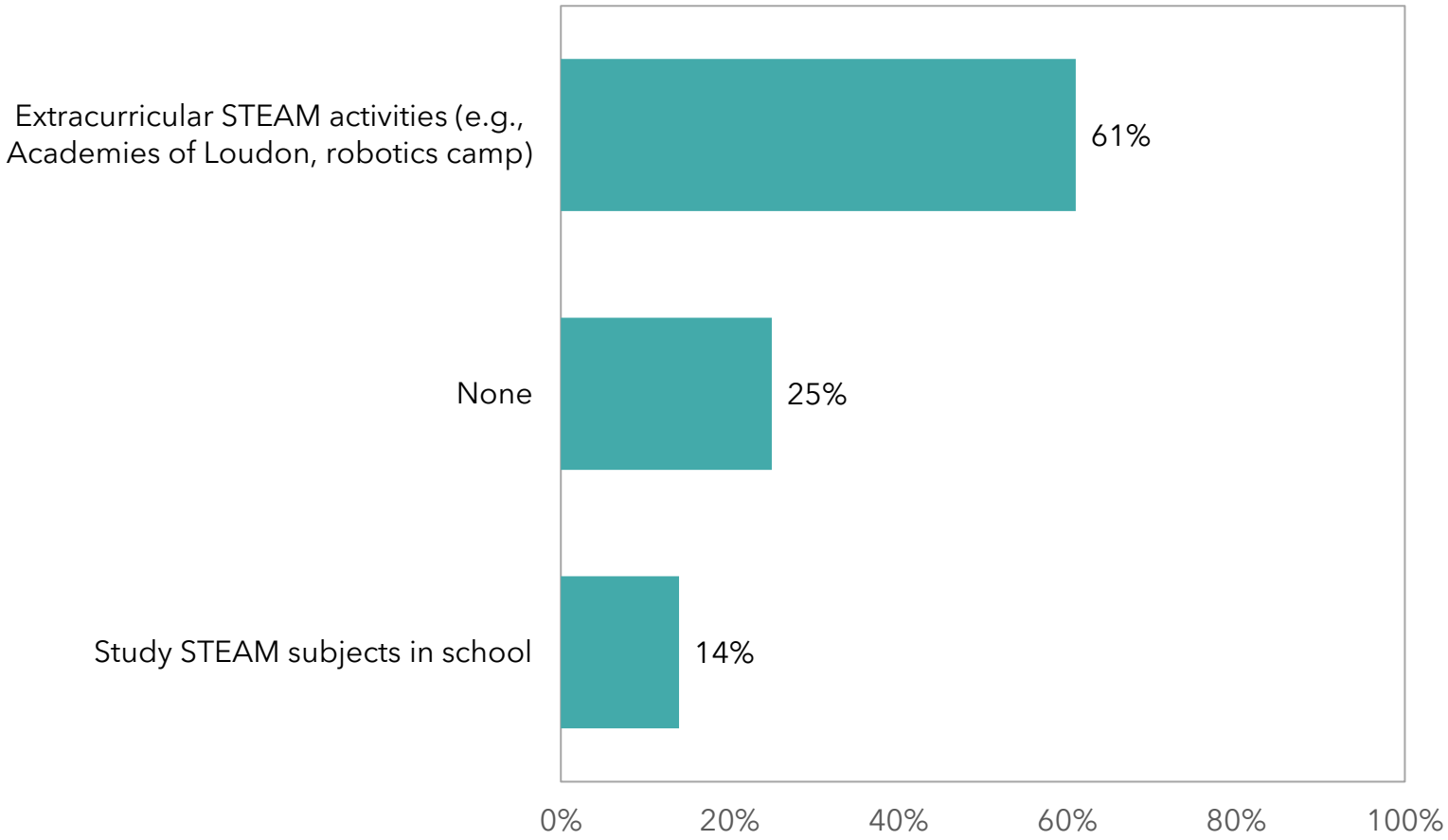
**What would you tell your friend was the worst part of camp? (n=152)**




One-third of respondents named an activity or presentation that they found boring (i.e., like school) or unclear (e.g., instructions for building the glider were unclear) (32%). One-fifth said nothing was the worst part of camp (20%).

# STEAM/AVIATION ACTIVITY PARTICIPATION (LEVEL 2 ONLY)

**What, if any, opportunities or activities related to STEAM and aviation have you participated in since attending camp last time? (n=28)**




About two-thirds of Level 2 respondents had participated in extracurricular STEAM or aviation activities since participating in Level 1 camp (61%). These activities included Academies of Loudon, robotics, space, and math/science camps, flying, and Civil Air Patrol.

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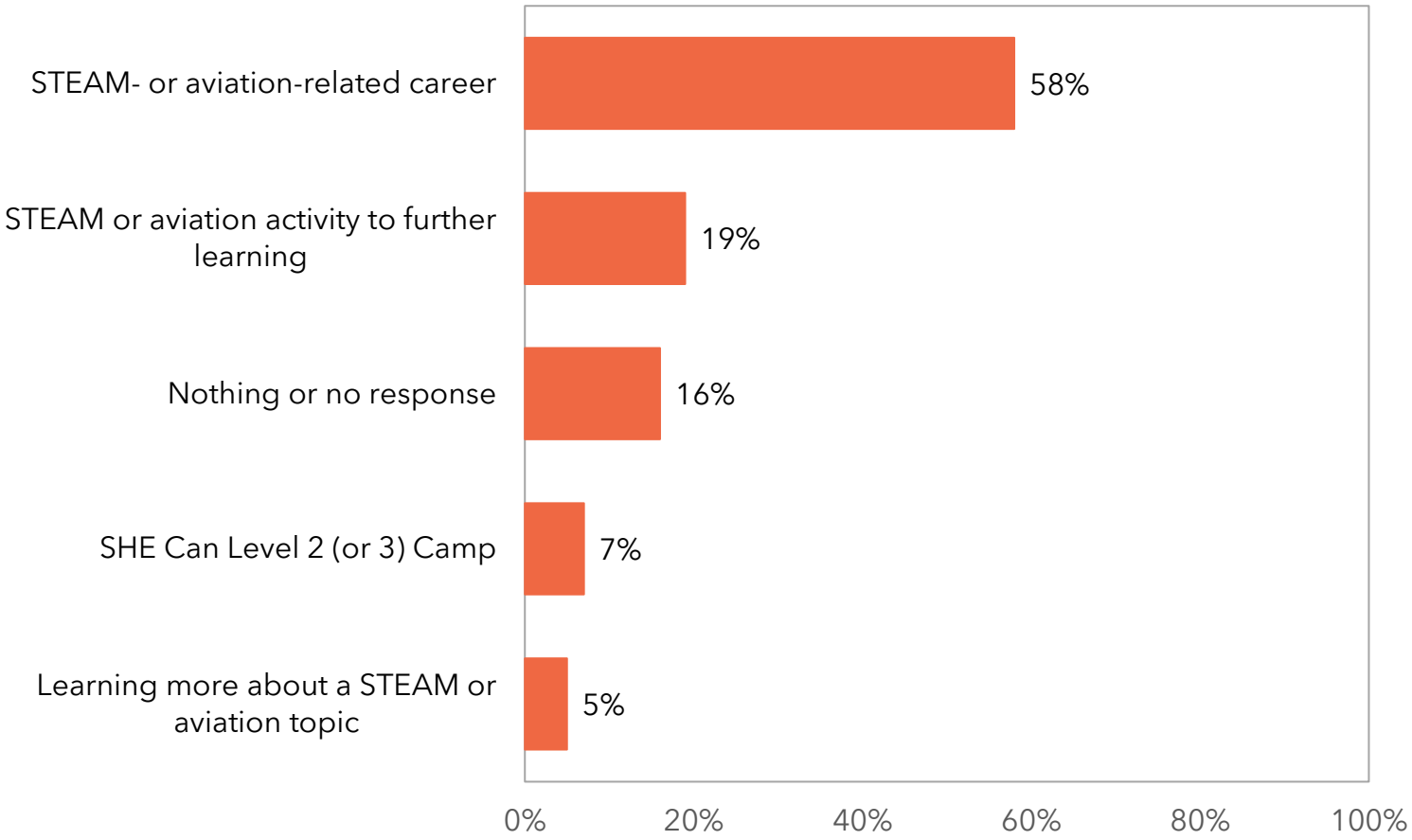
# INTEREST IN FUTURE STEAM/AVIATION OPPORTUNITIES

**What, if any, opportunities or activities related to STEAM and aviation are you interested in doing in the future? (n=154)**




More than one-half of respondents described an interest in a specific STEAM or aviation career (e.g., Civil Air Patrol, pilot) (58%). One-fifth described an interest in a program or activity related to STEAM or aviation (e.g., flying opportunities, STEAM camps) (19%).

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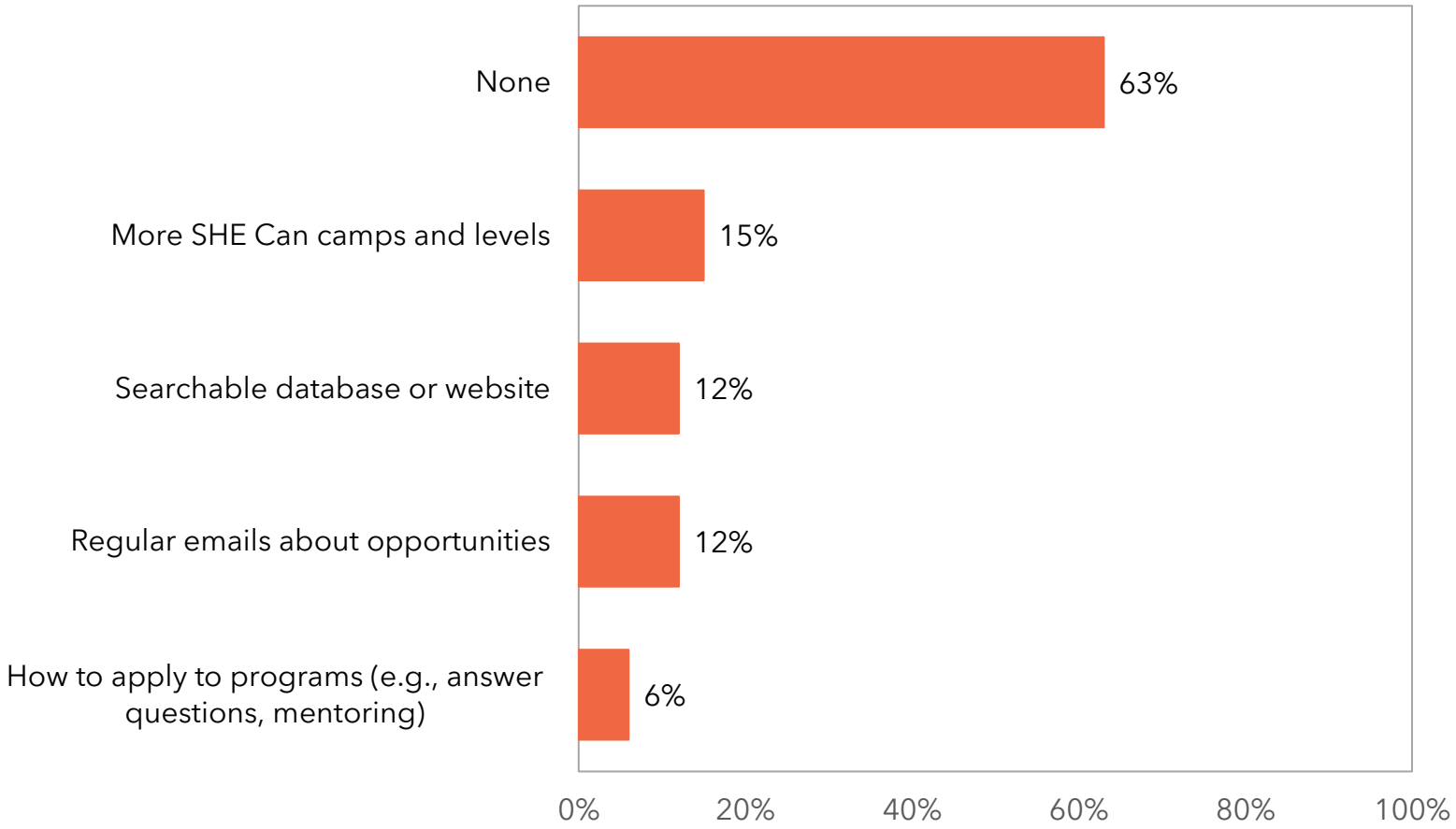
# SUGGESTIONS FOR HOW NASM CAN SUPPORT THEIR INTERESTS

**What suggestions do you have for how the camp and NASM could help you find and/or participate in STEAM and aviation related opportunities? (n=154)**




About two-thirds of respondents did not have any suggestions (63%). Suggestions included:

- Additional S.H.E. Can camps (15%)
- Searchable database of opportunities (12%)
- Regular emails with opportunities (12%)
- Support applying to programs (e.g., answering questions about applications) (6%).

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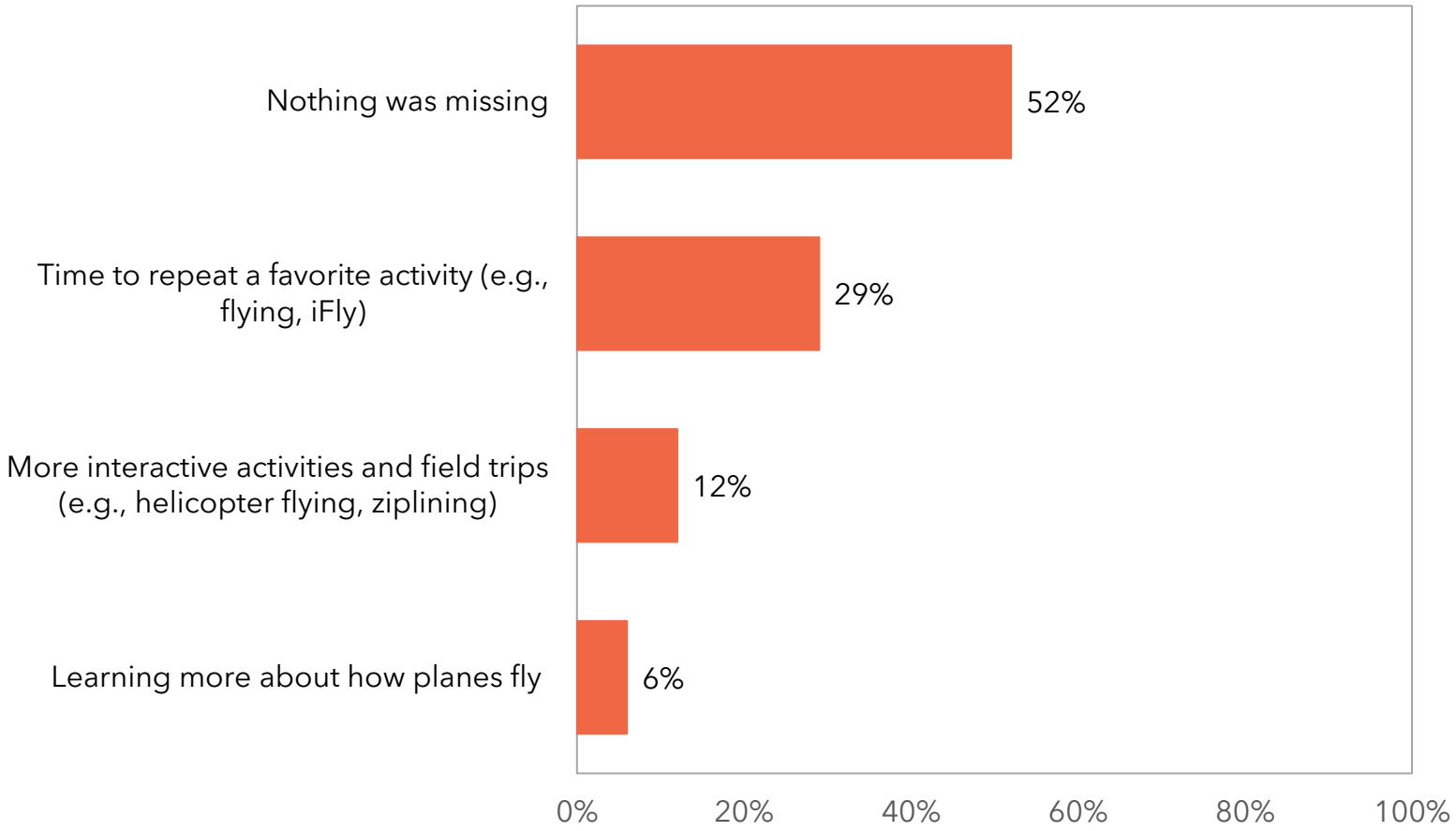
# OPPORTUNITIES THAT WERE MISSING

**Was there any experience or activity that you felt was missing? (n=58)**
This question was added later and was only answered by participants in the Virginia summer sessions (July and August 2022).




About one-half said nothing was missing (52%). One-third wanted additional time to repeat a favorite activity (in particular, flying and iFly) (29%).

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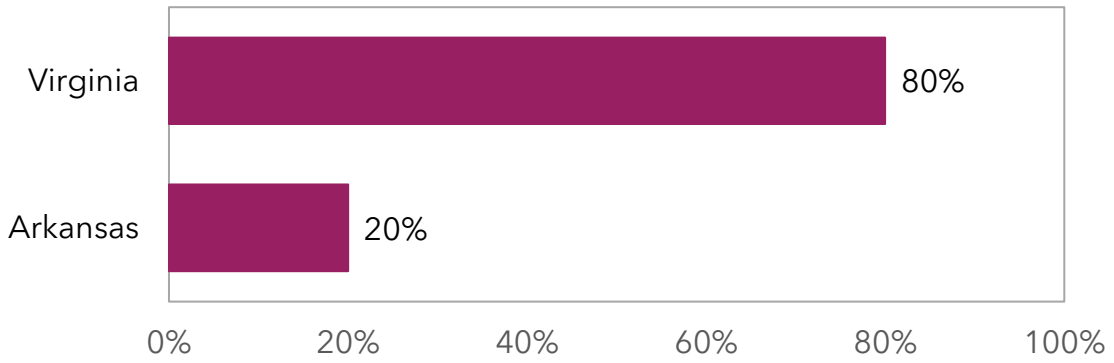
# GUARDIAN SURVEYS

# LOCATION & LEVEL

NASM staff surveyed guardians on the first day of camp (or shortly after) for 4 out of 6 sessions.[1] NASM collected a total of 71 surveys.

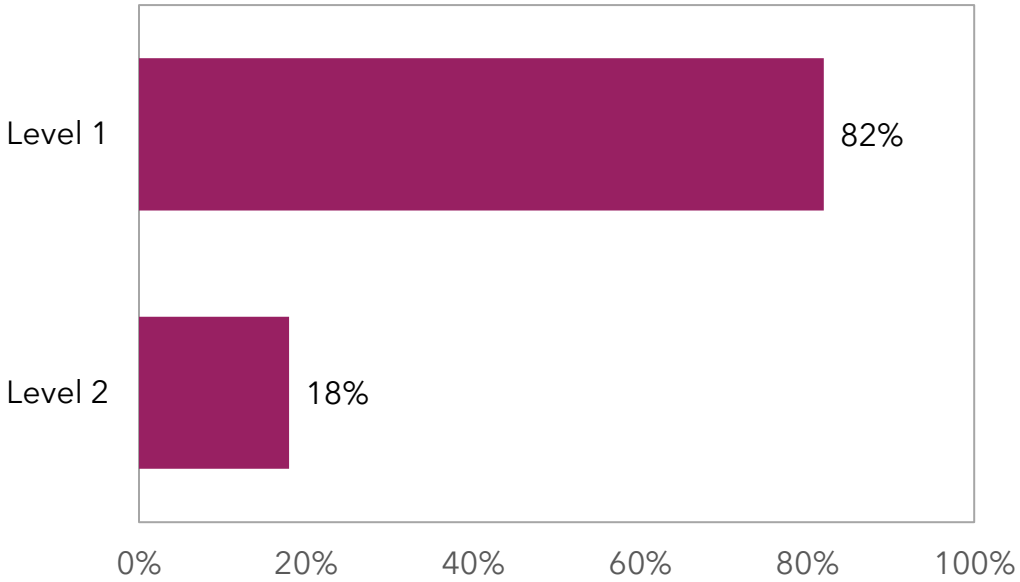
Most respondents were guardians of those who attended camp at the Chantilly, Virginia location (80%).

**Camp Location (n=71)**




Most respondents were guardians of those who were attending the camp for the first time (Level 1) (82%).

**Camp Level**




[1]Guardian surveys were not collected at the Arkansas summer session (June 2022) and the first summer session in Virginia (July 2022) due to extenuating circumstances.

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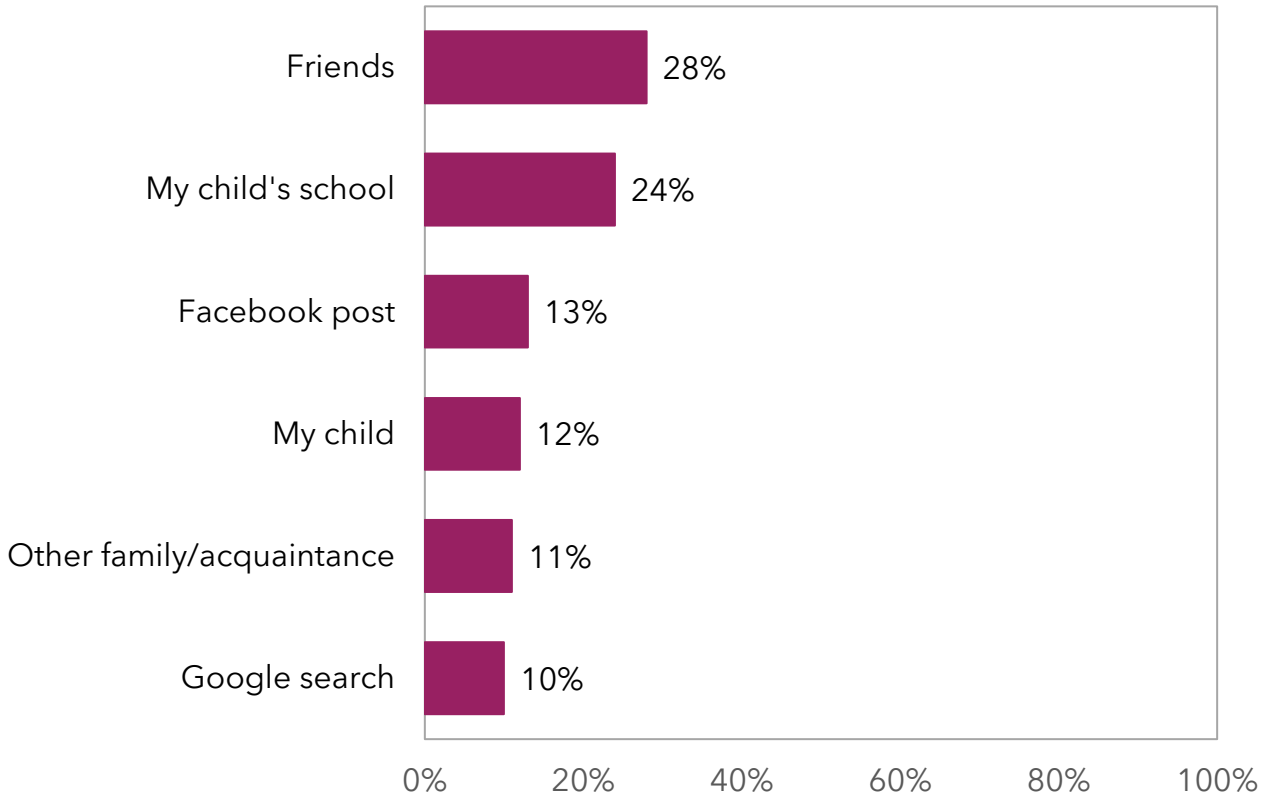
# AWARENESS OF CAMP

**How did you first hear about the summer camp? (n=71)**




About one-third of respondents heard about the camp from friends (28%). About one-quarter heard about the camp from their child's school (24%).

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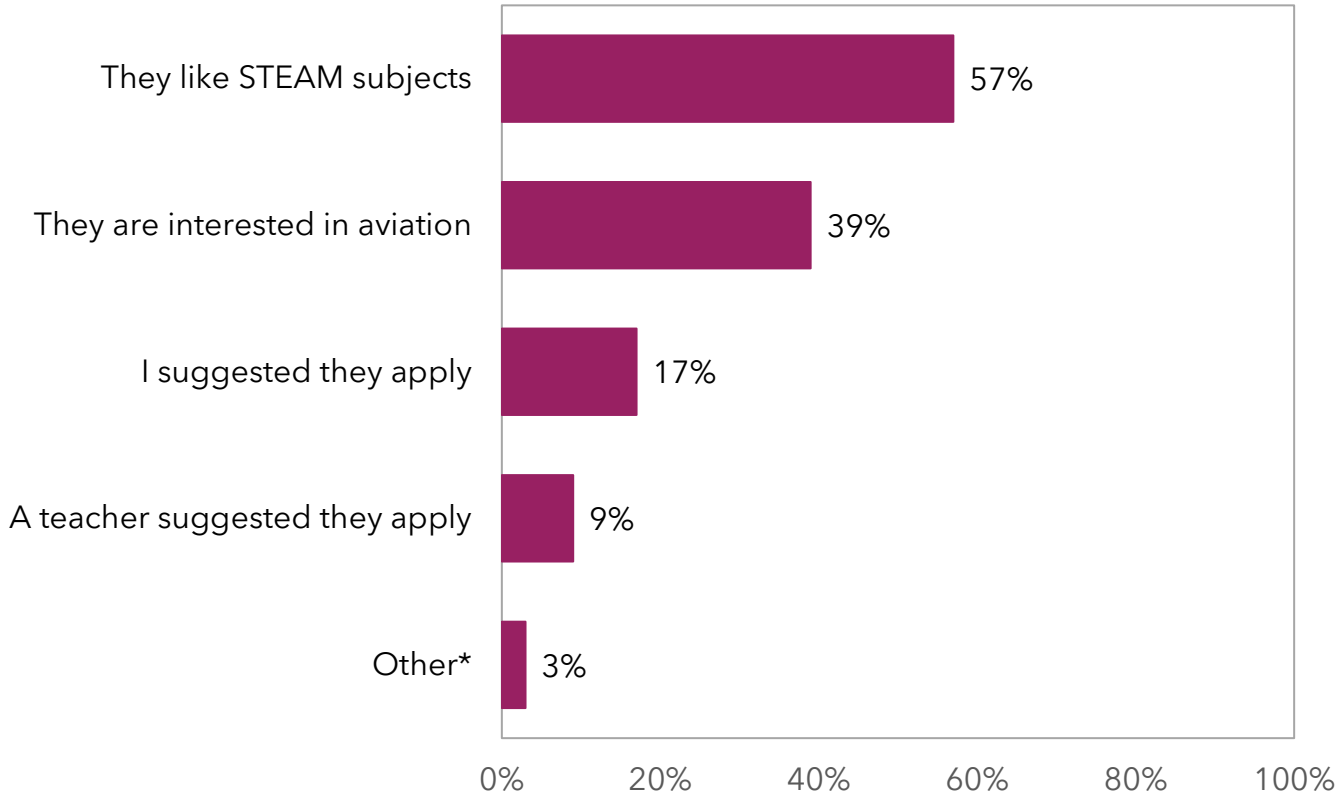
# CHILD'S MOTIVATION FOR APPLYING

**Why do you think your child wanted to apply? (n=70)**
Responses do not total 100% since some respondents selected more than one reason.




*Other: sibling attended and liked it

More than one-half of respondents indicated their child was motivated to apply because of their interest in STEAM subjects (57%). More than one-third indicated their child was motivated to apply by an interest in aviation (39%).

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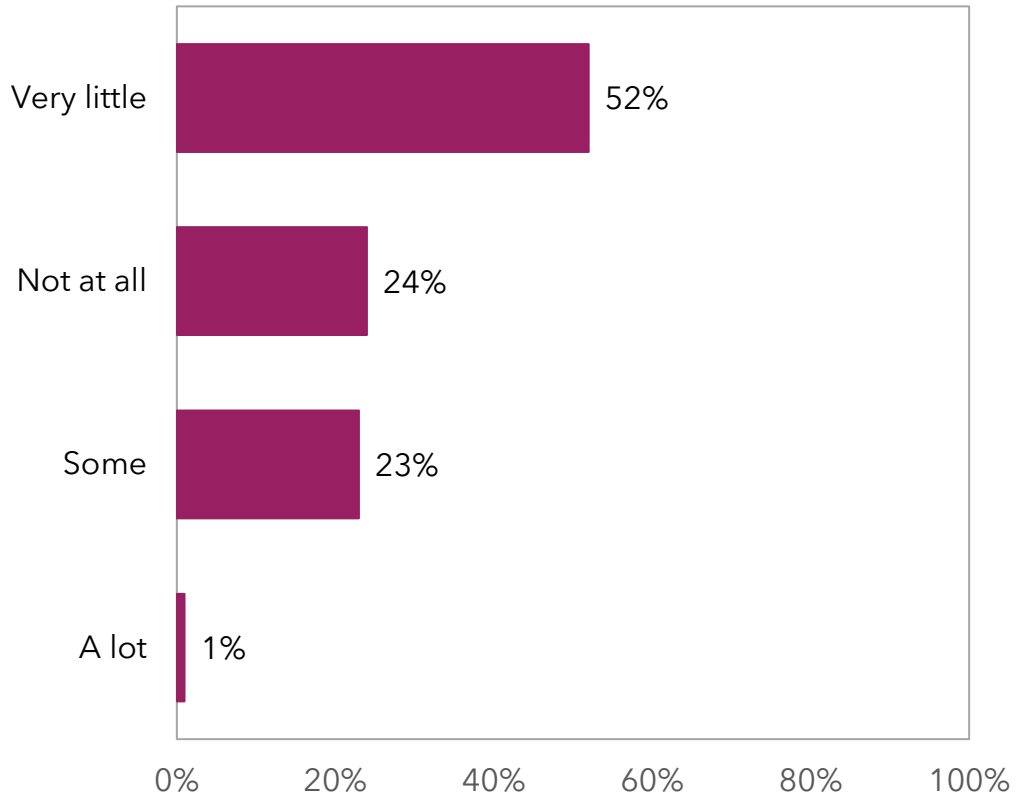
# LEVEL OF ASSISTANCE WITH APPLICATION

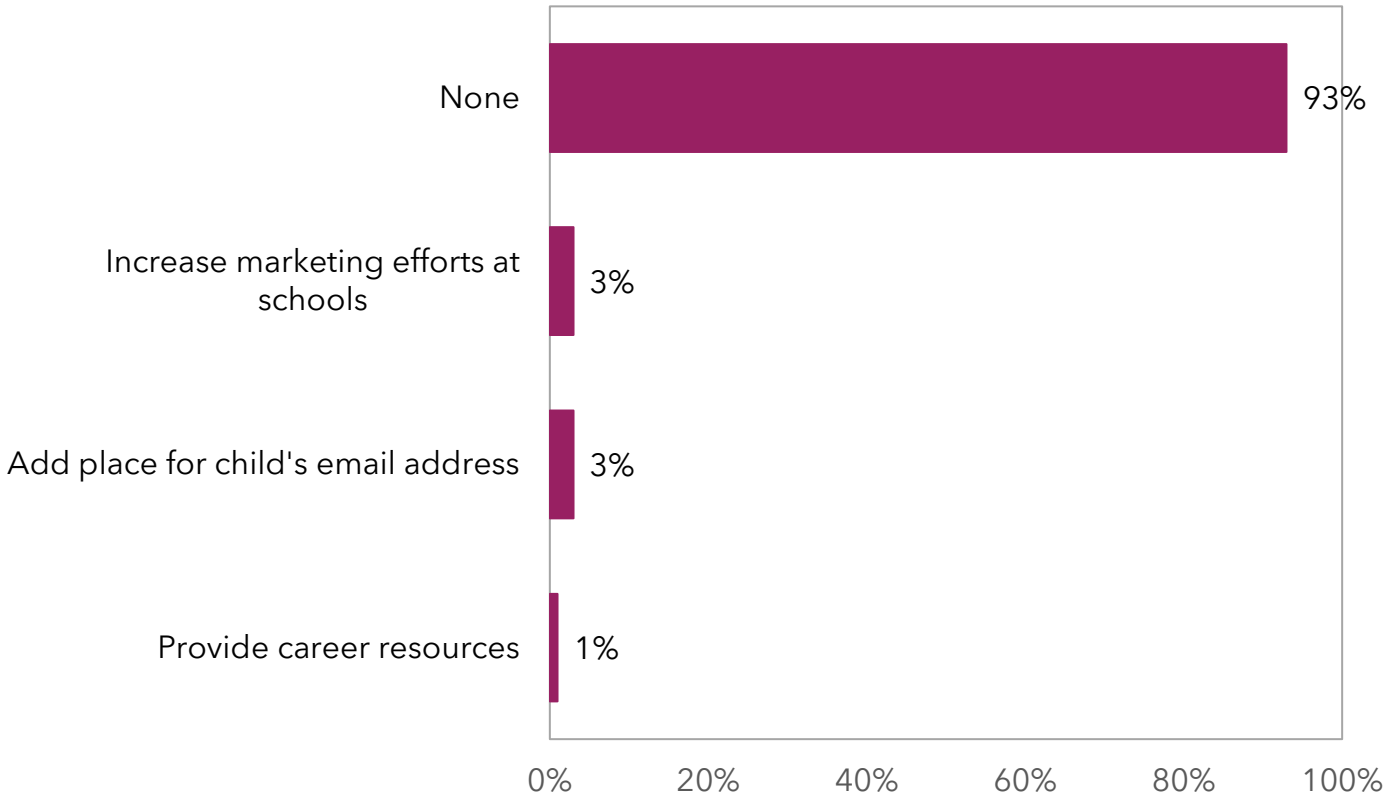
**How much did you need to help your child with the application process? (n=71)**




Three-quarters of respondents indicated that they did not need to help their child with their application (very little or not at all) (76%).

# SUGGESTIONS FOR IMPROVING THE APPLICATION PROCESS

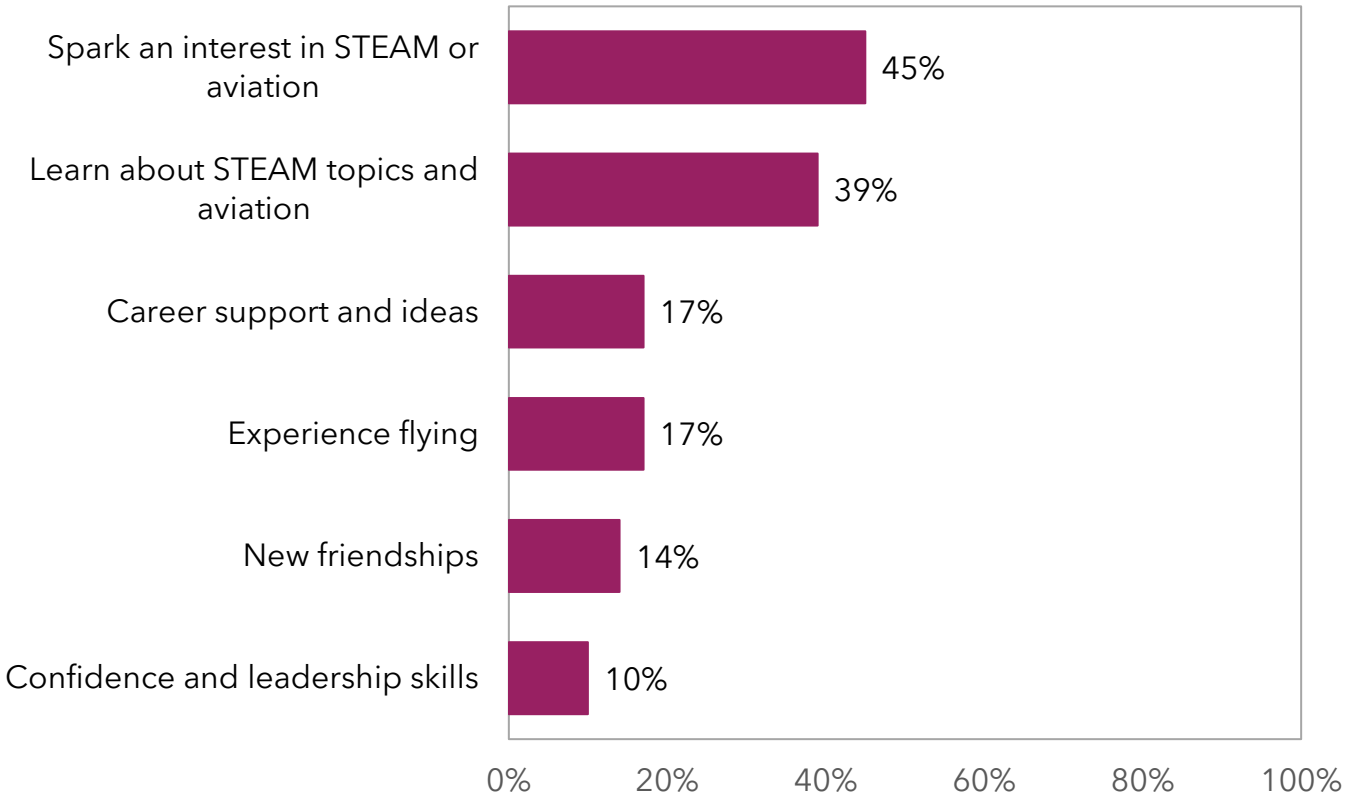
**Do you have any suggestions for improving the application process? (n=71)**




Most respondents did not have suggestions for improving the application process (93%).

# GOALS FOR CHILD'S PARTICIPATION

**What do you hope your child gains from their experience at camp? (n=71)**
Responses do not total 100% since some respondents listed more than one reason.




About one-half of respondents wanted the camp to spark their child's interest in STEAM or aviation (45%). About one-third wanted the camp to help their child learn more about STEAM topics and aviation (39%).

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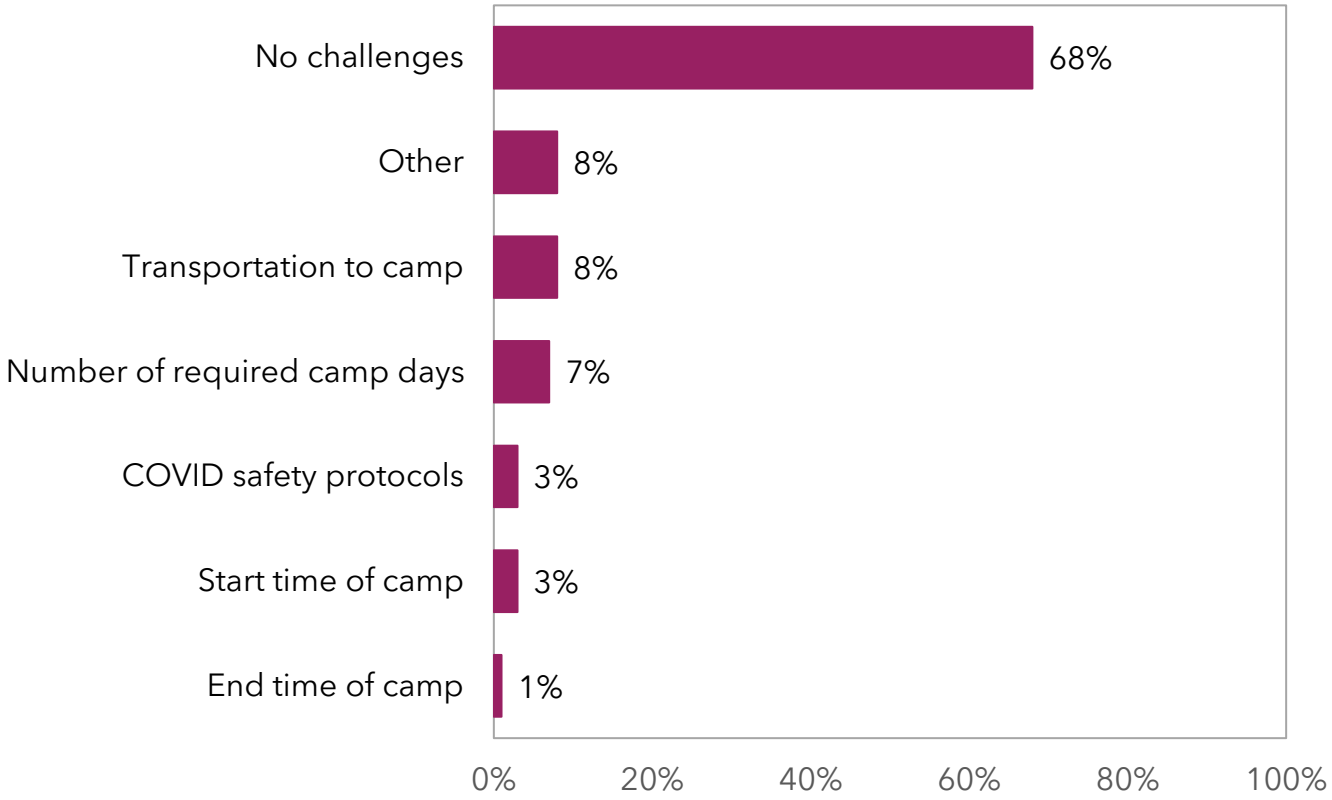
# ANTICIPATED CHALLENGES

**What challenges do you anticipate because of your child's participation in camp? (n=71)**




*Other: scheduling other school and extracurricular activities, medical concern

About two-thirds of respondents did not anticipate any challenges because of their child's participation in camp (68%).

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# INTERN INTERVIEWS

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# MOTIVATION FOR PARTICIPATING

Kera Collective interviewed 5 interns who facilitated the camps in Virginia by lesson planning, teaching lessons, and helping with daily administrative tasks, such as ordering supplies and food for campers. All 5 were facilitating the camp for the first time.

When asked why they were interested in helping with the camp, interns said:

- **Interest and experience working with children:** Most of the interns said they were interested in participating because they enjoy working with children and feel confident doing so from experience. One noted that they were interested in a teaching career and felt the camp was an opportunity to hone their skills.
- **No particular reason:** One intern did not state a specific reason for wanting to help with the camp; rather, they were interested in helping with any internship at the museum.

# STRENGTHS OF CAMP

When asked what they thought worked best about how the camp was run, interns said:

- **Existing lesson plans:** Most of the interns said they appreciated having existing lesson plans that they could tweak slightly by adding their own voice or interests (e.g., games they thought kids would be interested in). One noted that they were given time to familiarize themselves with the lessons which increased their overall confidence teaching.
- **Use of squadrons:** One intern liked that the campers were divided into squadrons as it helped the camp run smoothly from an activities perspective (i.e., rotating activities).

# WEAKNESSES OF CAMP

When asked what they thought did not work well about how the camp was run, interns said:

- **Lack of back-up plans:** Most interns said there were not enough back-up activities or ideas to replace cancelled activities (i.e., when weather cancelled flights) which made them feel unprepared.
- **Lack of instruction/support:** Three interns noted times when they felt they lacked support from supervisors (e.g., how to address negative camper interactions, camp procedures related to medical issues).
- **Mismatched skill levels:** Two interns said they thought some campers were placed in squadrons that did not match their knowledge and skill level. For example, one intern thought the activities for younger participants were too hard for them and led to frustration.

# SUGGESTIONS FOR IMPROVEMENT

When asked what suggestions they had for improving challenges they faced, interns said:

- **Back-up activities:** Most interns said the camp should have more back-up activities that facilitators can use if scheduled activities are unexpectedly cancelled (e.g., "shorter activities like games, museum-themed activities").
- **Additional staff:** One intern suggested hiring or having additional staff to address interpersonal dynamics of campers and sudden changes in the schedule.
- **Pre-camp survey to assess camper level:** One intern suggested assessing campers' knowledge and skills prior to camp in order to place them in the right squadron or group.

# MOST & LEAST ENGAGING ASPECTS FOR PARTICIPANTS

When asked which aspects of camp they thought were most engaging for participants, interns said:

- **Hands-on activities and field trips:** Most interns said hands-on activities (e.g., lessons that were turned into games, building projects) and experiential field trips (e.g., flying, iFly) were the most engaging.

When asked which aspects of the camp they thought were least engaging for participants, interns said:

- **Guest speakers:** Most interns said the guest speakers were the least engaging for participants because they:
  - were unknown and/or the participants did not have time to prepare questions to ask them;
  - discussed STEAM careers rather than STEAM topics which interns felt were less engaging for participants; and
  - lectured too much, and interns thought the sessions should be shorter and led as a discussion.

# TAKEAWAYS FROM FACILITATING CAMP

When asked what they took away from helping with the camp, interns said:

- **Gauging effectiveness of lessons:** Most interns said they learned how to use observation to gauge the effectiveness of lessons (i.e., by observing the engagement level of the participants) and that new topics were often most exciting to participants (e.g., drones). One also noted that journaling or short recaps/reflections were helpful for gauging the effectiveness of the lessons.
- **Creating engaging lesson plans:** Three interns said they learned how to create engaging lesson plans by providing real-world applications for the theories participants are learning about (e.g., "it is hard for some kids to understand what a math equation means but when you show them how to apply those to real world issues, it gives them a stronger understanding of why it is important"). They learned that the most effective way to show real-world application was through activities and games.
- **"Classroom" management:** Two interns noted that they learned how to manage large groups of middle-school-age children with different learning styles.
- **Interest in aviation and STEAM careers:** Two interns said they gained an interest in the STEAM field and bridging the gender gap by helping young people explore the possibilities of working in STEAM and aviation careers.