ENGINEERING DESIGN PROCESS

## Directions

In the table below, write or draw a picture explaining how Kaiʻulani and Kekahu completed each step of the engineering design process to create their parachute.

| **Steps of the Engineering Design Process** | **How did the siblings complete this step?** |
| --- | --- |
| **ASK** |  |
| **IMAGINE** |  |
| **PLAN** |  |
| **CREATE** |  |
| **IMPROVE** |  |

# Claim, Evidence, Reason

# *Directions*

# Write your initial Claim, Evidence, Reasoning (CER) statement on what *you hypothesize* will be the best parachute for Kaiʻulani and Kekahu:

# Parachute Testing Stations

## Directions

You do not have to go to the stations in order, but you need to go to each station. Fill out the following tables for each station and record your findings.

For every station, drop height (3 m) and suspension load (large binder clip) are control variables and should be listed with the others you identify.

| **Station 1: Canopy Size** | | | |
| --- | --- | --- | --- |
| **Control Variables** (list all of them) |  | | |
| **Dependent Variable** |  | | |
| **Independent Variable** |  | | |
| **Hypothesis** |  | | |
|  | **Test 1** | **Test 2** | **Test 3** |
| **Independent Variable Change You Made** |  |  |  |
| **Trial 1:** Dependent Measure and Observations |  |  |  |
| **Trial 2:** Dependent Measure and Observations |  |  |  |
| **Trial 3:** Dependent Measure and Observations |  |  |  |
| **Average** |  |  |  |
| **Was your hypothesis correct?** |  | | |

| **Station 2: Canopy Material** | | | |
| --- | --- | --- | --- |
| **Control Variables** (list all of them) |  | | |
| **Dependent Variable** |  | | |
| **Independent Variable** |  | | |
| **Hypothesis** |  | | |
|  | **Test 1** | **Test 2** | **Test 3** |
| **Independent Variable Change You Made** |  |  |  |
| **Trial 1:** Dependent Measure and Observations |  |  |  |
| **Trial 2:** Dependent Measure and Observations |  |  |  |
| **Trial 3:** Dependent Measure and Observations |  |  |  |
| **Average** |  |  |  |
| **Was your hypothesis correct?** |  | | |

| **Station 3: Canopy Suspension Length** | | | |
| --- | --- | --- | --- |
| **Control Variables** (list all of them) |  | | |
| **Dependent Variable** |  | | |
| **Independent Variable** |  | | |
| **Hypothesis** |  | | |
|  | **Test 1** | **Test 2** | **Test 3** |
| **Independent Variable Change You Made** |  |  |  |
| **Trial 1:** Dependent Measure and Observations |  |  |  |
| **Trial 2:** Dependent Measure and Observations |  |  |  |
| **Trial 3:** Dependent Measure and Observations |  |  |  |
| **Average** |  |  |  |
| **Was your hypothesis correct?** |  | | |

# Design Your Blueprint

Based on the data you have collected in the stations, which parachute design do you think would be best to get your 'ulu fruit safely to the ground?

Draw and label a blueprint of your best design below. Make sure to include a feature that will securely hold the 'ulu you have received because you will test the parachute several times.

|  |
| --- |
|  |

# Build and Test

* Build your parachute.
* Run three trials of your parachute. Document in the space below the fall time and other observations related to “protecting” the 'ulu as it falls:

# Assess and Reflect

Revise your Claim, Evidence, Reasoning (CER) statement on what the best parachute would be for Kaiʻulani and Kekahu:

Are there any changes you would make to your parachute design if you had more time?