### 1. Physical Characteristics of the Breadboard

The platform on which you will assemble (*prototype*) your circuits is referred to as **breadboard**. You can think of it as your workbench where you convert your circuits drawing (*schematics*) to a practical model. Knowledge of the underlying connections within the board will help you avoid problems associated with prototyping electric circuits.

1. [*Research and Communication*] Using your research skills determine the origin of the term **breadboard** and summarize it in your own words.

2. [*Analysis*] **The** image of a single, full size breadboard appears below. Using your arithmetic skills, determine the total number of holes it offers.

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 c) [*Communication*] Describe the organization of the holes.

 d) [*Communication*] Identify any colours you see and suggest what the purpose they might serve.

 e) [*Knowledge and Thinking*] From our previous workshop do you recall whether the holes closest to the red rail at the top connected to the holes closest to the red rails along the bottom?

 f) Using the numbers and letters, mark the following specific hole locations with your pencil.

 i) **A1** ii) **E1** iii) **G1** iv) **J1** v) **A2** vi) **H25**

### 2. Exploring the Breadboard with a DMM



 In an earlier worksheet you used the DMM’s ability to detect continuity. Placing the probes at either end of wire resulted the device emitting a beep. Let’s use the same strategy to determine which holes on the breadboard are connected.

 Set your DMM to Continuity (  ) and determine if the following sets of holes are connected.

 a) All the holes in the **blue** rail on **top** side of the breadboard? Answer (Y or N)\_\_\_\_\_

 b) All the holes in both the **top** **blue** rail *and* **bottom** **blue** rails? Answer (Y or N)\_\_\_\_\_

 c) All the holes in the **top** **red** rail? Answer (Y or N)\_\_\_\_\_

 d) All the holes in both the **top** **red** rail and **bottom** **red** rail? Answer (Y or N)\_\_\_\_\_

 e) Holes **A1** and **E1**? Answer (Y or N)\_\_\_\_\_

 f) Holes **E1** and **G1**? Answer (Y or N)\_\_\_\_\_

 g) Holes **G1** and **J1**? Answer (Y or N)\_\_\_\_\_

 g) Holes **A1** and **A2**? Answer (Y or N)\_\_\_\_\_

### 3. Additional Questions

 a) Suggest the simplest way to ensure all the holes in the top and bottom **blue** rails are connected (continuous).

 b) Similarly, suggest the simplest way to ensure all the holes in the top and bottom **red** rails are connected (continuous).

 c) Explain what is meant by a *short circuit* and the danger it presents.

 d) Considering your answers to the above questions, explain the WRONG way to connect the holes in the **blue** and **red** rails.