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| **TEACHER’S GUIDE-ON-THE-SIDE**  To help with writing, each student received a ½ sheet, like the one shown at right, and folded it into 4 sections. Then students revealed whichever section they wanted to focus on (one-at-a-time) and folded the other sections down behind it (so it’s a little springy folded paper – hence the name “springboard”.) This guide shows a 4th/5th grade unit about circuits. Then there is a 5th grade Force & Motion example that follows.  **UNPACKING THE PARTS OF THE**  **WRITING SPRINGBOARD**  D:\Masters Research Project\2013 - Pathways and Circuits Data and Lessons\Data\classroom chart photos\IP chart photos as of 1-22-13 (5).JPG**BIG IDEAS:** This section lists some of the BIG idea and unit objectives students would be expected to perform at the end of the unit (from district expectations, state standards, and NGSS). Students and teacher built some public representations together of these ideas during the unit that helped students with this part.  D:\Summer Video Project with Jessica\Elementary Circuit Videos\Minilesson - Gotta Have Checlist Summarizing Unit\Gotta Have (1).JPG  **EXPLANATION CHECKLIST:**  This explanation (or “gotta have” checklist) was a list students created with teacher facilitation towards the end of the unit to make a list of really important ideas. This list was posted in the room and then typed up in the springboard so it was right in front of them.  **SENTENCE STARTERS:** Include sentence starters to help students connect evidence to their ideas. Students should also refer to the summary table to help them write with evidence.  **WHAT-HOW-WHY LEVELS:**  D:\Masters Research Project\2013 - Pathways and Circuits Data and Lessons\Data\classroom chart photos\01-23 JL class work (4).JPGUse a What-How-Why rubric like the full page one shown here. Display it under the document camera and reveal each level, one-at-a-time. Have students give feedback as you read the example (Ask them “What’s missing?”). This helps students know they need to connect observations, ideas, and evidence as they write. | **Writing an Explanation About: Why Does Your Circuit Work?**  **In your writing, you need to:**   1. Describe where electric current flows in your circuit. (Also, share why you think it can flow where it does and why current does not flow through all materials.) 2. Describe what energy transformations happen in your circuit and where they happen. (Also, share why you think these transformations happen where they do.) 3. Use evidence to support your ideas.   **“Gotta Have” Checklist: What ideas do we “gotta have” in order to explain why our circuit works?**   * Circuits transform energy for a certain reason/function. * Circuits need a power source. * Circuits have conductive pathways (Think about how electrons behave in conductors and insulators.) * Circuits have to be connected for energy to move.   **For each idea you state in your explanation, what evidence do we have to support it?**   * My evidence for this idea is … * This idea is supported by the activity where we … * When we watched the video about \_\_\_\_\_\_\_, it stated that \_\_\_\_\_\_ which supports my idea. * When we did \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, it showed us that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ so therefore that supports my idea about\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Write a “WHY” level explanation.   **WHAT** happens? **HOW** does it happen? **WHY** does it happen?  Observations Only Observations + Ideas Observation +  Ideas + Evidence |
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**Remember to try to write a “WHY” level explanation. This is difficult to do, so use the evidence tables in your notebook as well as posters in the classroom to help remind you of all the evidence we have collected about circuits.**

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| **“What” Level**  I observe that…  In science class we… | **“How” Level**  I observe that…  In science class we… which showed me evidence that… | **“Why” Level**  I observe that…  In science class we… which showed me evidence that…  Even though I can’t observe \_\_\_\_\_\_\_ I think it is happening because… |
| *If you write at the “What” Level you only describe what happens like observations and what you did in experiments.* | *If you write at the “How” Level you describe observations PLUS how you think the things you observe happened using evidence.* | *If you write at the “WHY” level you explain why something happened. You tell the full story using observations and evidence and make claims about what is happening we can’t observe.* |
| **Short Example:**  When the wires are connected to the battery and bulb in the right way, the bulb lights up. If the battery is dead, the bulb will not light up. If the wires aren’t in the right places, it won’t light up. | **Short Example:**  When the wires are connected to the battery and bulb in the right way, the bulb lights up. This is because the wire is a conductor which is a pathway for energy. I know wire is a conductor because we did an experiment that showed… | **Short Example:**  When the wires are connected to the battery and bulb in the right way, the bulb lights up. This is because the wire is a conductor which is a pathway for energy. I know wire is a conductor because we did an experiment that showed…… I also know that inside a conductor there are electrons which…  In an insulator, electrons……which means that… |

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| **Writing The “Skateboarder Jump” Explanation**  **In your writing, you need to:**   1. Explain the motion of the skateboarder using the different forces that act on him. (Think about pushing, pulling, gravity, friction.) 2. Describe what energy transformations happen during the skateboarders jump. (Also, share how you think these transformations happen.) 3. Use evidence from the summary table to support your ideas.   **“Gotta Have” Checklist: What ideas do we “gotta have” in order to explain why our skateboarder fell?**   * How unbalanced forces cause different types of motion (starting, rolling, jumping, falling, stopping).      * Why stopping fast hurts more than stopping slowly.      * How friction affects skateboard motion. * How energy changes (transforms) from the energy in the skater’s breakfast to the noise he makes when he lands (or crashes) after the jump.   **For each idea you state in your explanation, what evidence do we have to support it?**   * My evidence for this idea is … * This idea is supported by the activity where we … * When we did \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, it showed us that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ so therefore that supports my idea about\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Write a “WHY” level explanation.   **WHAT** happens? **HOW** does it happen? **WHY** does it happen?  Observations Only Observations + Ideas Observation +  Idea + Evidence | **Writing The “Skateboarder Jump” Explanation**  **In your writing, you need to:**   1. Explain the motion of the skateboarder using the different forces that act on him. (Think about pushing, pulling, gravity, friction.) 2. Describe what energy transformations happen during the skateboarders jump. (Also, share how you think these transformations happen.) 3. Use evidence from the summary table to support your ideas.   **“Gotta Have” Checklist: What ideas do we “gotta have” in order to explain why our skateboarder fell?**   * How unbalanced forces cause different types of motion (starting, rolling, jumping, falling, stopping).      * Why stopping fast hurts more than stopping slowly.      * How friction affects skateboard motion. * How energy changes (transforms) from the energy in the skater’s breakfast to the noise he makes when he lands (or crashes) after the jump.   **For each idea you state in your explanation, what evidence do we have to support it?**   * My evidence for this idea is … * This idea is supported by the activity where we … * When we did \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, it showed us that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ so therefore that supports my idea about\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Write a “WHY” level explanation.   **WHAT** happens? **HOW** does it happen? **WHY** does it happen?  Observations Only Observations + Ideas Observation +  Idea + Evidence |

**Remember to try to write a “WHY” level explanation. This is difficult to do, so use the evidence tables in your notebook as well as posters in the classroom to help remind you of all the evidence we have collected about the SKATEBOARD JUMP.**

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| **“What” Level**  I observe that…  In science class we… | **“How” Level**  I observe that…  In science class we… which showed me evidence that… | **“Why” Level**  I observe that…  In science class we… which showed me evidence that…  Even though I can’t observe \_\_\_\_\_\_\_ I think it is happening because… |
| *If you write at the “What” Level you only describe what happens like observations and what you did in experiments.* | *If you write at the “How” Level you describe observations PLUS how you think the things you observe happened using evidence.* | *If you write at the “WHY” level you explain why something happened. You tell the full story using observations and evidence and make claims about what is happening we can’t observe.* |
| **Short Example:**  When the skater stands on the board and pushes down and back with his foot, they both move forward. I observed that when he leans back and the front wheels come up. When he does it fast enough, he goes into the air. The first time he lands and rolls to a stop. The second time he jumps I noticed that he doesn’t land right and falls forward because his body keeps going. | **Short Example:**  When the skater stands on the board, he doesn’t move. In class, I observed that the k’nex car didn’t move when nothing was pulling it. That’s evidence that the forces are balanced because it is not moving. The skater pushes back and he moves forward. This push force gets the skater moving just like the washer weight pulled the k’nex car to get it going. | **Short Example:**  When the skater stands on the board, he won’t move. The forces are balanced. Gravity pulls the body down to the board and the board pushes up. There aren’t any sideways pushes or pulls to make it unbalanced. In class, the teacher stood on the skateboard and was balanced. She didn’t move. Also the k’nex car didn’t move unless washers were added as weight to pull it sideways. When he puts his foot down to push, the chemical energy stored in his body turns into motion energy. The push makes him move because there’s nothing there to stop the motion forward. |