*Booklet for Background Research in ISP Tutor*

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| **Name:** |  | **Date:** |  |

On the Home & Help page: <https://go.isptutor.org/brm/home> ...

Follow **STEP 1** and click on the link for the lesson on selecting a good research question. There is audio, so make sure you can hear it.

* **What are some tips for choosing a good research question?**

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**STEP 2:** Go back to the Home & Help page and follow the directions for STEP 2. This will take you a lesson in which you will pick your research question. This also has audio. (Click on the blank screen, then “Start” to begin.)

Try to apply what you learned in STEP 1 when picking a research area, topic, and question. Make sure to think carefully about your selections.

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| * **What area of science did you choose to test and why?** |
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| * **What topic did you choose to test and why?** |
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| **What variable did you choose to test and why?** |
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| * **Your Research Question:** |  |

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| * **What is the outcome/dependent variable?** |  |

* **List the materials in the experiment you chose:**

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* **Describe what happens in one trial of your experiment. List any unfamiliar terms.**

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**STEP 4: PLAN YOUR RESEARCH.**

**Phase #1:** First, make a list of the basic concepts or questions you have that are related to your experiment that you need to learn about or make sure you really understand. These basic concepts include things like:

* The substances or other materials in the experiment (e.g., salt, water, yarn) involved in physical or chemical reactions; make sure you understand what these substances or materials are made of.
* Any terms used in the animation describing the experiment (e.g., “saturation point”).
* The independent variable and dependent variable of your research question.

**Please list these words below. Then write what you think these terms mean (before you do research to find out). Don’t complete the last column (yellow-highlighted) just yet.**

**Concept/Question: My initial understanding: Understanding from research: STEP 5**

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| *Example: What is salt?* |  | *Salt is crystal substance. I think it’s made of Na and Cl atoms.* |  | *Salt is a crystal, whose molecules form a repeating pattern. Its molecules are NaCl.* |
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Read **STEP 3** on the Home & Help webpage (<https://go.isptutor.org/brm/home/>). Follow the directions given there.

* **Use the space below to take notes of the “Plan Your Research” video:**

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* **Use the space below to take notes of the “Plan Your Research” video:**

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When you’re done with STEP 3, continue on the next page…**STEP 4: FINISH PLANNING YOUR RESEARCH.**

**Phase #2: Describe processes that lead to the outcome of the experiment.**

Now that you have a better understanding of the concepts or materials involved in the experiment, we’ll think about the things that are happening in this experiment—or what causes the outcome.

**So now, think about:** What happens or what is changing during the experiment? Write these down below. *For example, in the crystal growth experiment, one change is “salt dissolves in the water.” In the ramps experiment, one change is “the ball accelerates down the ramp” or “the ball starts to roll.”*

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| **Change 1:** |  |
| **Change 2:** |  |
| **Change 3:** |  |
| **Change 4:** |  |

*The final change should be related to your dependent variable. Note: You can add more changes if you’d like.*

**STEP 5: DO YOUR RESEARCH**

**Instructions for the next pages:** For each change, try to explain in detail what is happening. If relevant for your experiment, try to explain what the atoms or molecules are doing. Also try to figure out and explain why this happens while doing your research. What *causes* each change?

**For each change, also think about how the variable you’re testing may affect that part of the process (it might or it might not).**

You will be done with your research when you’ve explained all of the changes you listed above. When you’re done with your research, you will make your final prediction and set up your final hypothesis.

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| **Change 1:** |  |

**Q1**. List the names of **units** and/or search terms you used to find information (so that you can find this information later if you need to):

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| 1) |  |  | 2) |  |
| 3) |  |  | 4) |  |

**Q2.** Why and how does this change happen?

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**Q3.** Use the space below to draw what happens for this change. (You will add other changes to this drawing.)

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| **Change 2:** |  |

**Q1**. List the names of **units** and/or search terms you used to find information (so that you can find this information later if you need to):

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| --- | --- | --- | --- | --- |
| 1) |  |  | 2) |  |
| 3) |  |  | 4) |  |

**Q2.** Why and how does this change happen? Also, think about whether—and if so, how—previous changes may affect this change.

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**Q3.** Use the space in the page above (under Q3) to add a drawing of what happens in Change 2.

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| **Change 3:** |  |

**Q1**. List the names of **units** and/or search terms you used to find information (so that you can find this information later if you need to):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1) |  |  | 2) |  |
| 3) |  |  | 4) |  |

**Q2.** Why and how does this change happen? Also, think about whether—and if so, how—previous changes may affect this change.

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**Q3.** Use the space in page 5 to add a drawing of what happens in Change 3:

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| **Change 4**: |  |

**Q1.** List the names of **units** and/or search terms you used to find information (so that you can find this information later if you need to):

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| --- | --- | --- | --- | --- |
| 1) |  |  | 2) |  |
| 3) |  |  | 4) |  |

**Q2.** Why and how does this change happen? Also, think about whether—and if so, how—previous changes may affect this change.

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**Q3.** Use the space in page 5 to add what happens in Change 4.

**Q4.** Is this Change related to Change 1, Change 2, or Change 3? If so, describe how below:

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**At this point, you should have a good understanding of what happens in your experiment.**

**But make sure to check with your teacher to make sure you didn’t miss anything and do have an accurate understanding of these concepts.**

* **Based on your research, state your hypothesis, or explanation of the answer to your research question for how the independent variable affects the dependent variable:**

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