

# IPS.A/B INQUIRY LAB OUTLINE AND CHECKLIST

EVERYTHING MUST BE TYPED - Double-spaced - IN 12 PT FONT

**Title** (Use the underlined headings as headings in your lab write-up)

- Your title should give a CLEAR idea what your experiment is about. Use a subtitle if necessary.

## **Essential Question**

- Should be in the form of a QUESTION that identifies the *independent* and *dependent* variables:
- Use the format: "How does (*increasing/decreasing/changing...ind variable*)...effect...(*dep variable*)?"

## **Background**

- P1: RESEARCH and EXPLAIN the scientific ideas AND key vocabulary related to your experiment. OPTION: Try using TREAC, starting with a statement like: "In this experiment we will investigate the relationship between our independent variable \_\_\_\_\_ and our dependent variable \_\_\_\_\_."
- P2: Explain how you came up with your experiment - including: 1) any related experiments you've done, and/or 2) observations, and/ or 3) other information that led to your idea for this experiment.

## **Hypothesis**

- Make an EDUCATED GUESS about the possible relationship between the ind/dep variables in the form "If we change...(independent variable)...then we think...(dependent variable)...will (*increase/decrease*) because..."

## **Materials**

- Make a COMPLETE LIST of all materials used AND how much of each USING METRIC UNITS.
- OPTION: Include a labeled diagram or photographs of how the lab is set up.

## **Procedure**

- Make a LIST of NUMBERED the steps (1...2...3...).
- Explain exactly HOW to do each step SO ANYONE COULD REPEAT IT without asking you questions.
- Explain WHAT to measure about the independent AND dependent variables - and HOW to measure it.
- Include enough trials (3-5 minimum) so you will have enough accurate data. Ex: "Repeat steps ..."

## **Data**

- Make a data TABLE for recording measurements. Include columns for the independent and dependent variables AND THE UNITS. Include a place for recording other related observations.
- Include a column or row for AVERAGING the results.

>>>> ABOVE - work WITH your Lab Group; BELOW - you MUST do on your OWN

## **Results**

- Make a GRAPH of the AVERAGE results following the Graphing Guidelines on the back of this sheet.
- P1: DESCRIBE what your graph shows. Describe the SPECIFIC VALUES from the data that are important to answering your Essential Question. (OPTION: IF APPROPRIATE discuss the MEAN, MEDIAN, MODE and RANGE)
- Look for patterns in the data and identify any relationship between the independent and dependent variables (EXAMPLE: positive or negative correlation)?
- P2: EXPLAIN your results SCIENTIFICALLY. Use the vocabulary and ideas from your Bckgrnd Resreach.
- OPTION: Discuss any OUTLIERS, overlapping RANGES, and/or other observations from the experiment.

## **Conclusion**

- P1: RESTATE your *Essential Question* and *Hypothesis*. Ex: "We were trying to find out..."
  - BRIEFLY SUMMARIZE your *Procedure* in one or two sentences.
  - Give an ANSWER to your *Essential Question* and state if your *Hypothesis* was correct or not.
  - SUMMARIZE the specific *Data* and/or *Results* that support the answer to your *Ess Question*.
- P2: REVIEW your experiment for obvious LIMITATIONS and possible SOURCES of ERROR.
  - Make suggestions that would improve your experiment if it was to be repeated.
- P3: Explain how what you learned applies to other areas outside the classroom.

MAKE SURE ALL IDEAS ARE IN COMPLETE SENTENCES - ORDERED INTO PARAGRAPHS

## GRAPHING GUIDELINES

- **Graph AVERAGE results whenever possible !**
- **USE METRIC UNITS ONLY!**
- **NO MINI GRAPHS** : the graph should be at least 1/2 page in size !
- Use the computer to graph if you know how
- If you draw it, USE A RULER to draw **STRAIGHT** lines !

• IF POSSIBLE: Graph the AVERAGE of the trials of data you collected.
• Choose the right kind of graph for the results (line, bar, pie chart, Hi-Mean-Lo, scatter plot, other)
• Give the graph a TITLE that clearly relates to the <i>Essential Question</i> .
• Label the X axis with the INDEPENDENT variable and the UNIT of measure. USE METRIC UNITS ONLY.
• Label the Y axis with the DEPENDENT variable and the UNIT of measure.
• Make a SCALE that will show all of the DATA.
• ALIGN number values with TICK marks on the axes - spaced EQUALLY apart.
• Start the SCALE with ZERO where the X and Y axis meet (or a use a "broken scale" if you know how)
• IF APPROPRIATE: Use a LINE BREAK to show a break in the scale.
• AVOID labeling every unit and instead number by 2's, or 5's, or 10's ... whatever best fits the data
• FOR LINE GRAPHS: IF APPROPRIATE: Draw a TREND line to smooth out the data.
• IF APPROPRIATE: Include a LEGEND to identify variables/values.

### EXAMPLES:

Title: Clearly refers to Essential Question

