Writing Lab Reports

NORFOLK STATE UNIVERSITY
OFFICE OF ACADEMIC ENGAGEMENT
WRITING CENTER

Two Locations: In the Lyman Beecher Brooks Library, First Floor and Madison 109

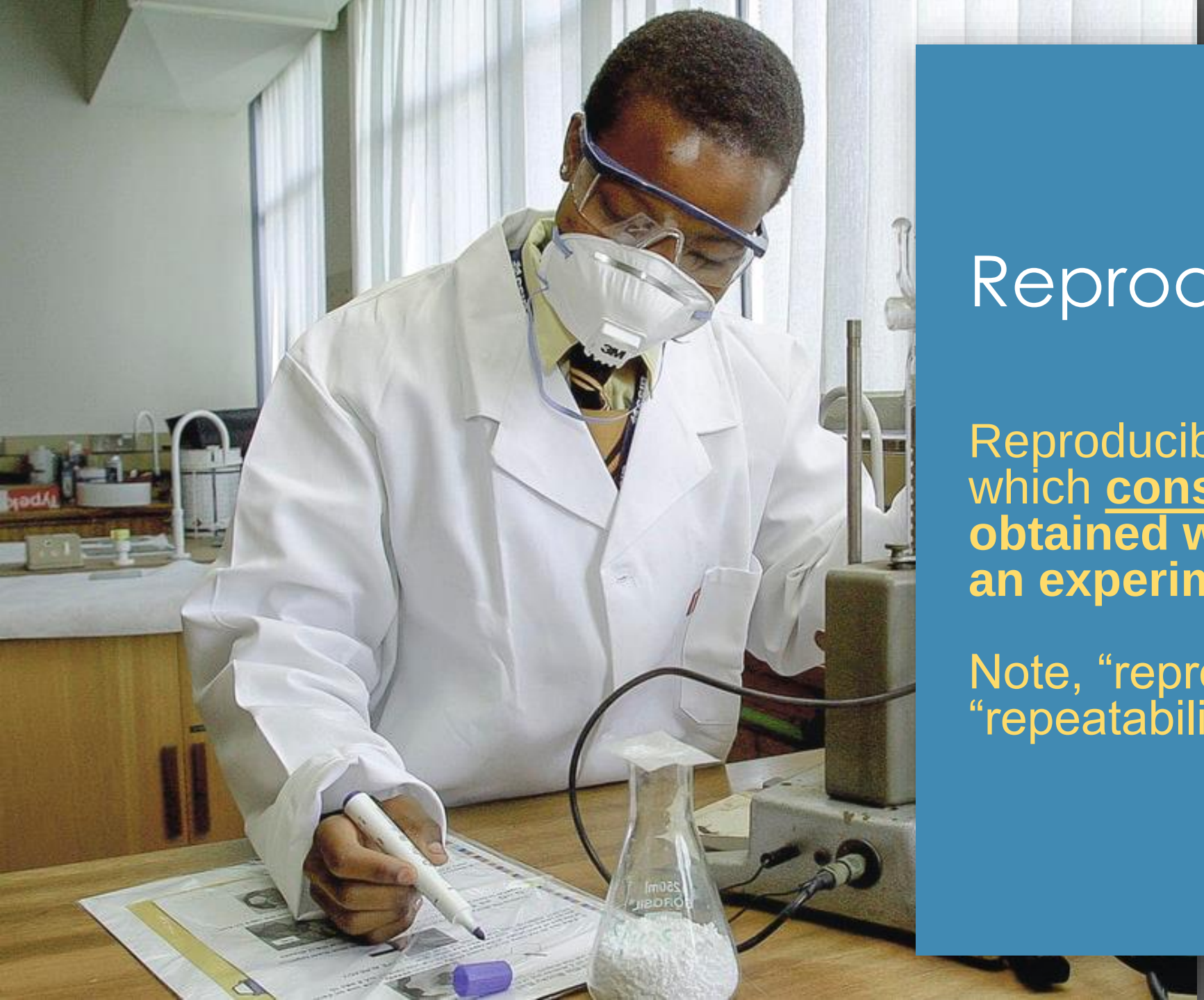
Tel: 757-823-2271
Email: writingcenter@nsu.edu *Website: nsu.edu/writing-center*

Introduction

In this workshop session, participants will learn how to write and format lab reports to meet professional expectations.

Purpose of a Lab Report

- Help establish standards of experimental procedure
- Propose future studies or alterations to current studies
- Communicate methodology and results to establish reproducibility



Reproducibility

Reproducibility is the extent to which **consistent results are obtained when reproducing an experiment.**

Note, “reproducibility” and “repeatability” are not the same!

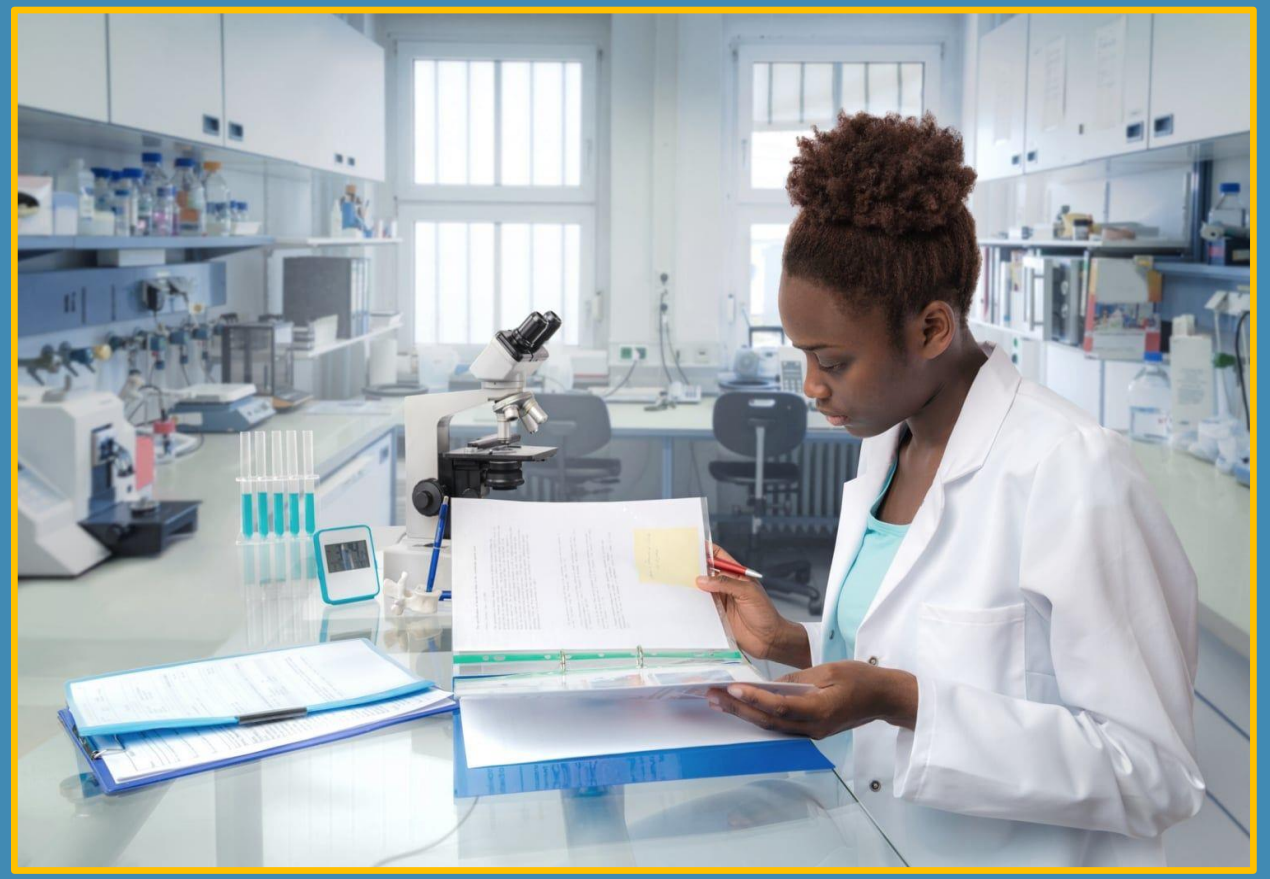
Which is the "reproducible" example?

1. Inject 10 frogs with 1.0ml of a 10% JCL solution
2. Give ten frogs injections of 1.0 of a .9% NaCl solution
3. Keep frogs in square tanks at 25°C for 1 day in 1 inch of water
4. After one day, take frogs out, and slap the ground behind them. Repeat three times.
5. Repeat with *Rana catesbeiana*

Ten species of *Rana pipiens* were injected with 1.0ml of a 10% JCl solution. Ten control frogs were given injections of 1.0ml of a .9% NaCl solution. All frogs were maintained in 3 m square tanks at 25°C for 1 day in 1 inch of water. At this time each frog was placed on an open floor and induced to jump 3 times by slapping the ground behind the frog. The jumping distance was defined as the average of the 3 jumps. The same procedure was repeated using *Rana catesbeiana*.

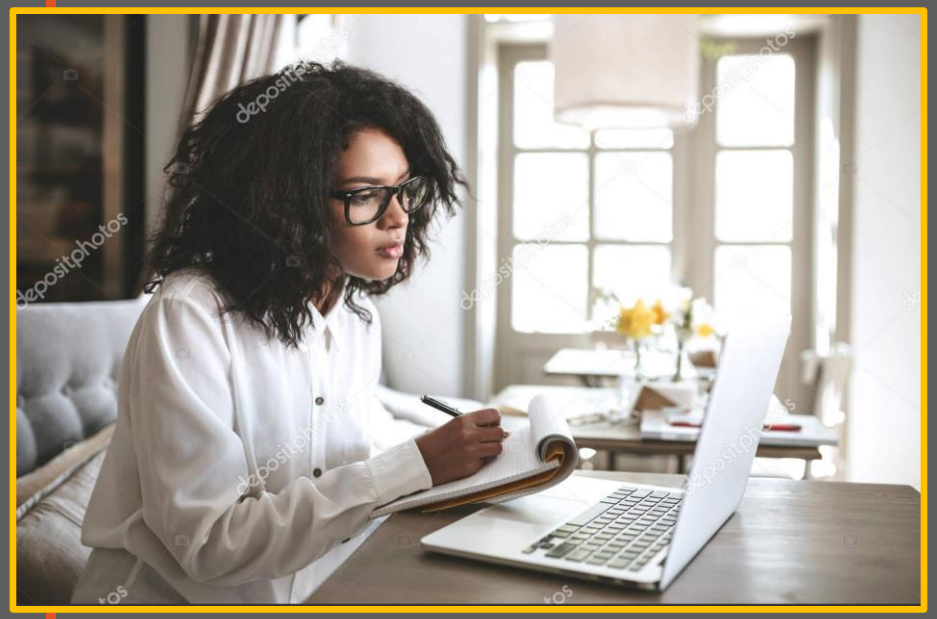
What constitutes a “good” lab report?

- Written in full, narrative paragraphs
- All units are appropriately labelled
- Clear descriptions of qualitative observations
- Uses references, and fully notes deviations from published procedure
- Written in third-person, past-passive voice



Third-person Past-Passive Voice

- Avoid using the subjects “I,” “we,” “you,” “he/she,” or “they”
- Describe all experimental actions in the past tense
- Refer to all lab equipment, theories, and the report itself in the present tense



First-Person Past-Active:	Third-Person Past-Passive:
We injected ten specimens of *Rana pipiens* with 1.0 ml. of a 10% JCl solution.	Ten specimens of *Rana pipiens* were injected with 1.0 ml. of a 10% JCl solution.

From Active to Passive (And back again)

To change between active and passive voice, add a conjugation of “to be” to make a sentence passive, and remove it to make it active.

	Past	Present	Future
Active -> Passive	I opened the door.  The door was opened.	Kids love movies.  Movies are loved by kids.	We will elect a woman.  A woman will be elected.
Passive -> Active	Justice was served.  The court served justice.	Dinner is made by him.  He makes dinner.	The dishes will be cleaned.  I will clean the dishes.

Practice

	Past	Present	Future
Active -> Passive	I opened the door. → The door was opened.	Kids love movies. → Movies are loved by kids.	We will elect a woman. → A woman will be elected.
Passive -> Active	Justice was served. → The court served justice.	Dinner is made by him. → He makes dinner.	The dishes will be cleaned. → I will clean the dishes.

Change these sentences from first-person active to third-person past-passive:

1. Using a pipette, I added 10ml of citric acid to 5g of baking soda.

   10ml of citric acid were added to 5g of baking soda using a pipette.

2. Swirl the solution in a flask for 30 seconds to stimulate color-change.

   To stimulate color change the solution was swirled in a flask for 30 seconds.

Take note!

All good lab reports start before the experiment ends. Take copious notes, including all measurements and methods, to make writing your report easier.

Ensure you follow all lab requirements, including:

- using the appropriate writing instrument;
- using descriptive language to record observations, and not a phone to take photos;
- recording all materials used, as well as any deviations from experimental procedures.

Lab Report Structure

a. Title Page
b. Introduction
c. Hypothesis
d. Materials
e. Experimental Procedure
f. Data Analysis/Results
g. Calculations
h. Discussion
i. References

Hypothesis

If you learn how to write a strong lab report, then your chemistry grade will increase. At least, that's the hypothesis.

Not all hypotheses need to be written with an "If…then…" statement, although it should always reference expected outcomes.

Rana pipiens, pre-injection of JCl

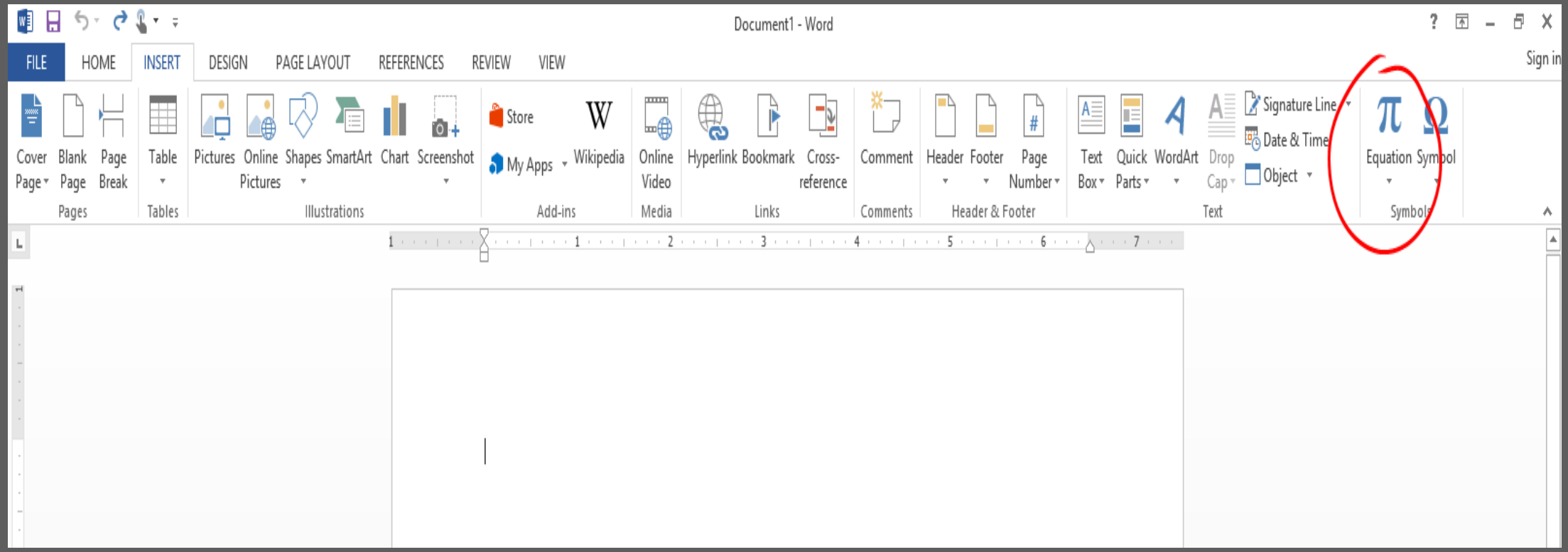
Hypothesis Example

“Specifically, we will test whether injecting frogs with JCl results in the frog’s ability to jump further than those not injected with JCl.”

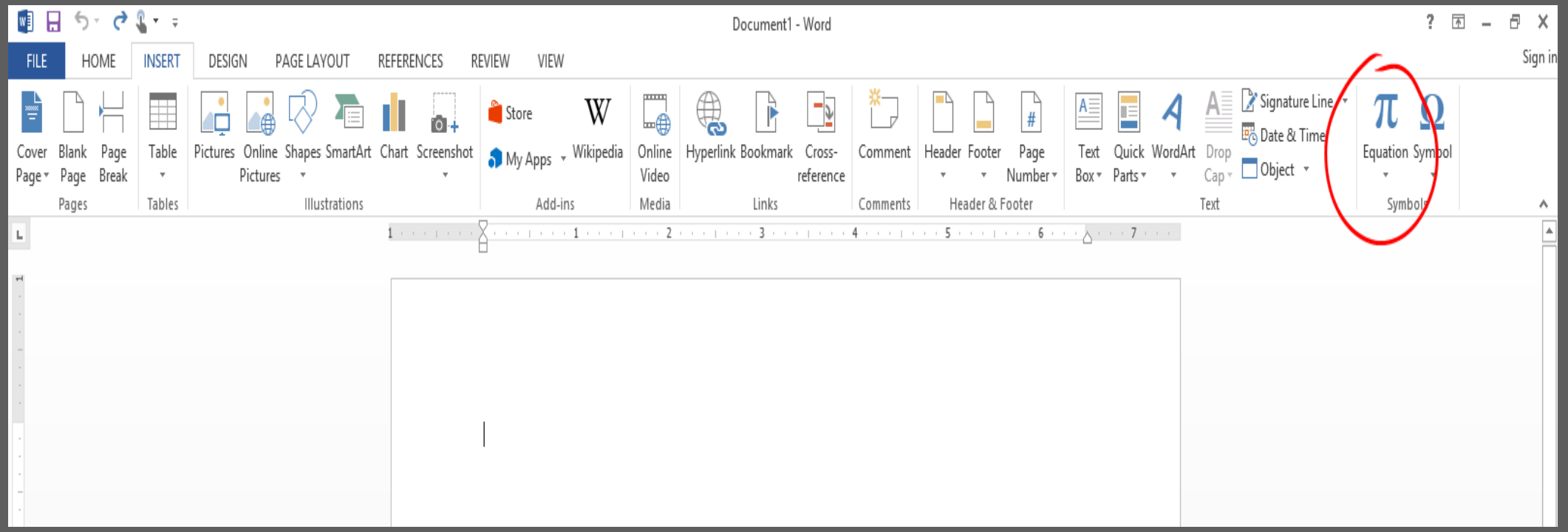
Rana pipiens, post-injection of JCl

Using Microsoft Word Equations

Writing your lab reports is easier once you learn the full functionality of Word. Word will allow you to write calculations and insert super/subscript.



Using Microsoft Word Equations



To write your calculations, click the “equation” symbol and choose the equation you are calculating from the drop-down list.

You may also write your own equations with the symbols provided.

Using Microsoft Word Shortcuts

Use shortcuts to accelerate your typing and make your reports look more formal.

Superscript:

On Windows hold: Hold Ctrl + Shift + Plus sign (+)
On Mac hold: Hold ⌘ + Shift + Plus sign (+)

X^3 $100(32^4)$ $a^2 + b^2 = c^2$

Using Microsoft Word Shortcuts

Use shortcuts to accelerate your typing and make your reports look more formal.

Subscript:

On Windows hold: Hold Ctrl + Equal sign (=)
On Mac hold: Hold ⌘ + Minus sign (-)

H_2O $C_8H_9NO_2$ CCl_4

Using Microsoft Excel

Graphs and tables should be plotted in Excel and properly labelled, then exported to Microsoft Word. Name all tables starting with “Table 1,” and name all graphs starting with “Figure 1.”

Table 1: The effect of JCl on jumping distance in *Rana pipiens* and *Rana catesbeiana* at 25^0 C

Frog type	Jumping distance (m)
Rana pipiens (JCl treated)	4.2
Rana pipiens (control)	2.3
Rana catesbeiana (JCl treated)	2.5
Rana catesbeiana (control)	2.6

Using Microsoft Excel

Table 1: The effect of JCl on jumping distance in *Rana pipiens* and *Rana catesbeiana* at 25^0 C

Frog type	Jumping distance (m)
Rana pipiens (JCl treated)	4.2
Rana pipiens (control)	2.3
Rana catesbeiana (JCl treated)	2.5
Rana catesbeiana (control)	2.6

To export to Word:

1. Select the table
2. Uncheck “view gridlines” under the “Page Layout” tab
3. Copy and paste the table directly into Word

For graphs, copy and paste the graph directly into your lab report.

PRACTICE

NORFOLK STATE UNIVERSITY
WRITING CENTER

Rewrite each part below as a narrative in third-person past-passive voice appropriate for use in a lab report.

Part 1: The effect of JCl on jumping distance:

1. I inject 10 species of *Rana pipiens* with 1.0 ml. of a 10% JCl solution.
2. I give ten control frogs injections of 1.0 ml of a .9% NaCl solution.
3. Keep frogs in 3m square tanks at 25°C for 1 day in 1 inch of water.
4. After one day, I take the frogs out, place them on the floor, and slap the ground behind them to get them to jump. Repeat three times.
5. I repeat the procedure using *Rana catesbeiana*.

PRACTICE

NORFOLK STATE UNIVERSITY
WRITING CENTER

ANSWER

Part 1: The effect of JCl on jumping distance:

Ten specimens of *Rana pipiens* were injected with 1.0 ml. of a 10% JCl solution. Ten control frogs were given injections of 1.0 ml of a .9% NaCl solution. All frogs were maintained in 3 m square tanks at 25°C for 1 day in 1 inch of water. At this time each frog was placed on an open floor and induced to jump 3 times by slapping the ground behind the frog. The jumping distance was defined as the average of the 3 jumps. The same procedure was repeated using *Rana catesbeiana*.

PRACTICE

NORFOLK STATE UNIVERSITY
WRITING CENTER

Rewrite each part below as a narrative in third-person past-passive voice appropriate for use in a lab report.

Part 2: The effect of temperature on jumping distance:

1. I place each of the JCl treated frogs in a 3m square temperature controlled tank containing 1 inch of water and ranging from 0 to 90°C in intervals of 10°C.
2. I place one control frog in the tank with each treated frog.
3. I leave frogs in the temperature controlled tanks for 24 hours
4. Test for jumping performance following same procedure as part 1.

PRACTICE

NORFOLK STATE UNIVERSITY
WRITING CENTER

ANSWER

Part 2: The effect of temperature on jumping distance:

Each of the JCl treated frogs was placed in a 3 m square temperature controlled tank containing 1 inch of water and ranging from 0 to 90°C in intervals of 10°C.. One control frog was placed in the tank with each treated frog. The frogs were left in the temperature controlled tanks for 24 hours, and then tested, as above, for jumping performance.

REVIEW

NORFOLK STATE UNIVERSITY
WRITING CENTER

- ✓ Lab reports should be written clearly in order to encourage reproducibility.
- ✓ Use the third-person past-passive voice in narrative paragraphs.
- ✓ Include all relevant components of lab report structure, including all methods, data, results, analyses, and conclusions.

REFLECTION

Workshop Evaluation for students

Workshop Evaluation for faculty

Two Locations: In the Lyman Beecher Brooks Library, First Floor and Madison 109

Tel: 757-823-2271 *Email: writingcenter@nsu.edu* *Website: nsu.edu/writing-center*