



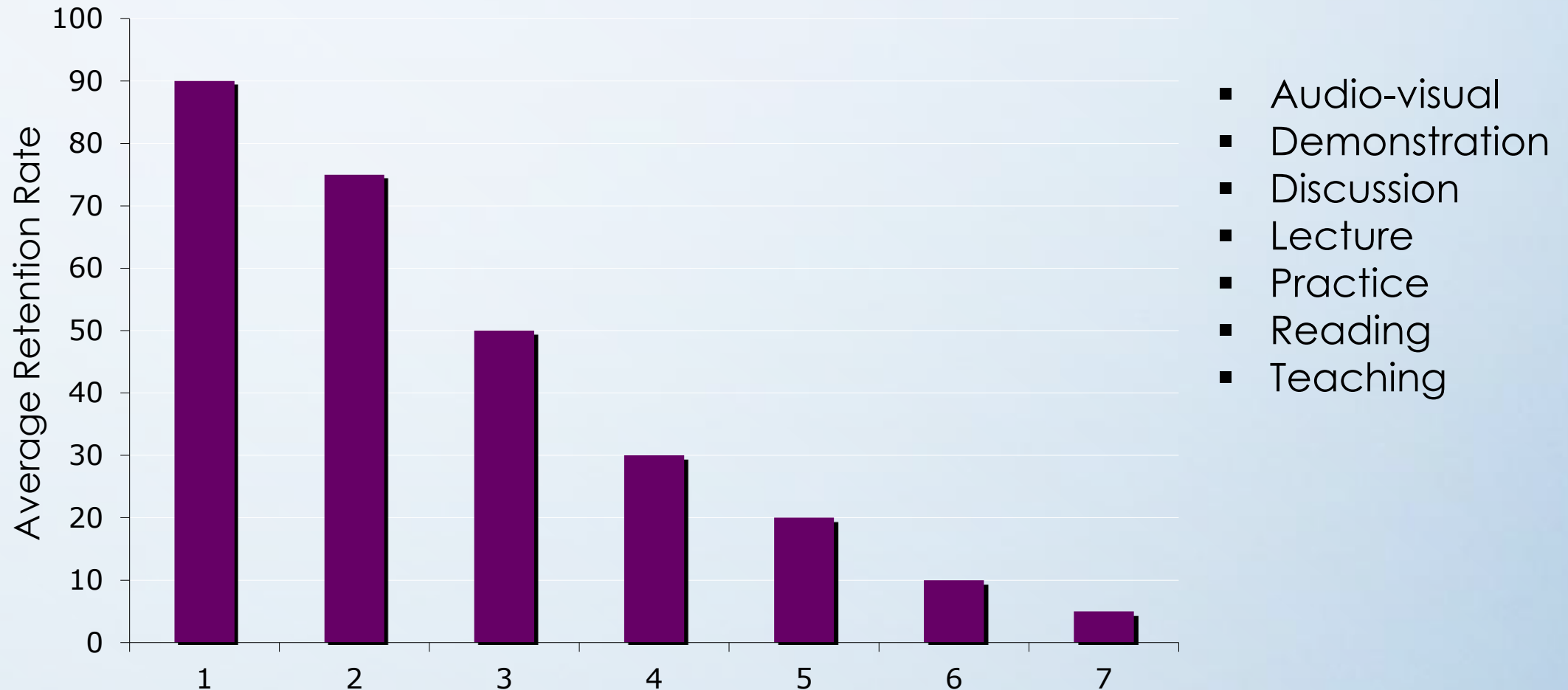
Overcoming barriers to learning in large classrooms

Using simple technologies & techniques in a large classroom to facilitate learning for all

Outline

- Who am I?
- What do I teach?
- How do I teach?
 - Information overload
 - Technologies I use
 - Not so technical strategies I use
- UDL in my courses
 - Strive to provide multiple ways for students to interact with the course material

How do you learn?



Turn to your neighbor and put these 7 types of learning in order in terms of retention rate.

How do you learn?



Clicker Question

So if we know traditional lectures aren't as effective, why do lectures persist?

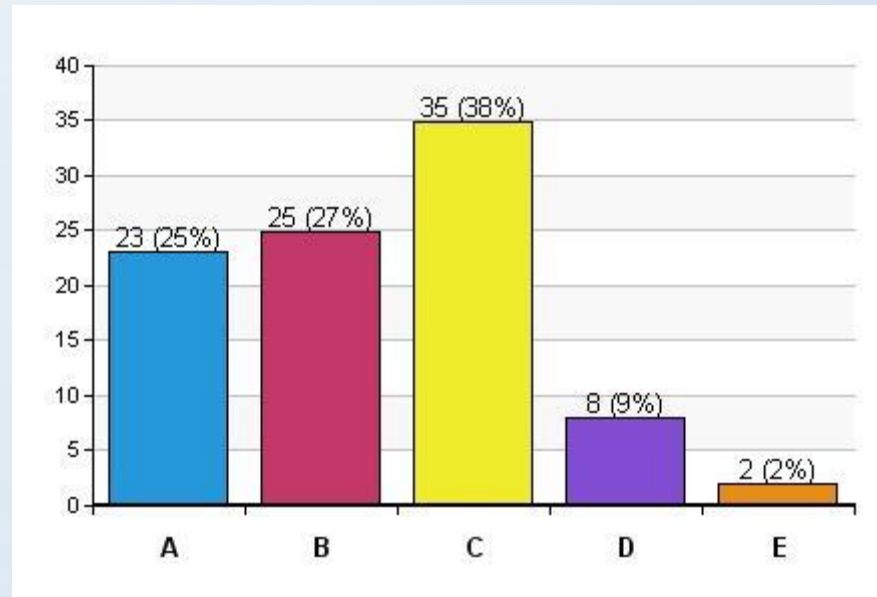
- A. Professors feel more comfortable teaching the way they were taught
- B. Lectures aren't all bad, facts need to be delivered somehow
- C. Lectures are cheap
- D. Most campus classroom spaces are built for lectures
- E. All of the above

Let's get technical

- iClickers
- Lecture Capture
- Annotated PPT

iClickers

- Formative assessments
 - Lecture for a few minutes and stop for iClicker
 - Immediate feedback about course in general (e.g. pace, use of technology, etc.)
- Quizzes
- Think-pair-share



Clicker Question

Making recorded lectures available to students always decreases class attendance.

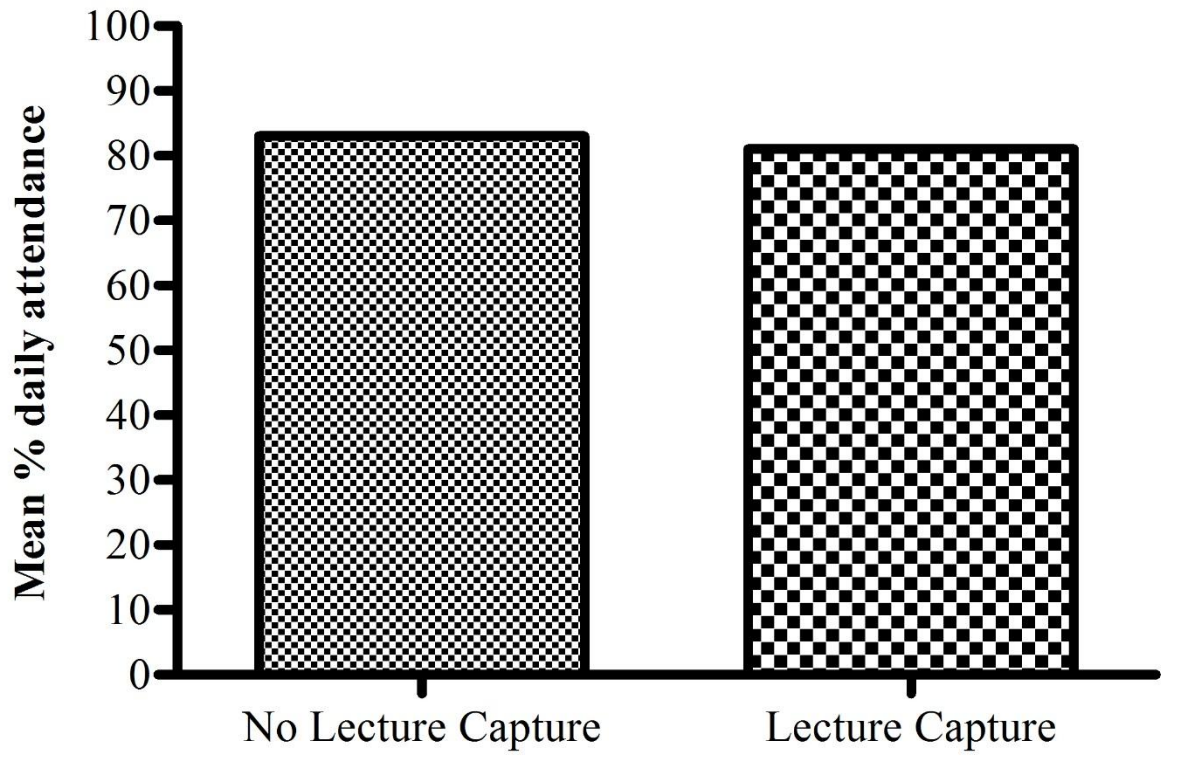
a. True

b. False

Lecture Capture

- Attendance not affected
- Echo 360 (others: Panapto, Camtasia, etc.)

Daily attendance with or without video lecture capture



Annotated PPT

- Tablets
 - External tablet
 - Tablet PC
- Interactive notes
- Remindful of old chalkboard days but with more benefits

Not so technical strategies

- Group Exams
- Cheat sheets
- Hands-on models and Classroom flipping
 - Magnetic board activity
 - 3-D model activity

Group Exams

- Problem-based learning
- Collaborative learning
- Peer teaching



Permission to use these photographs was granted by the students.

Hands-on Models & Class Flipping

1. Antibody Epitope Activity
2. Translation Activity

Why classroom flipping?



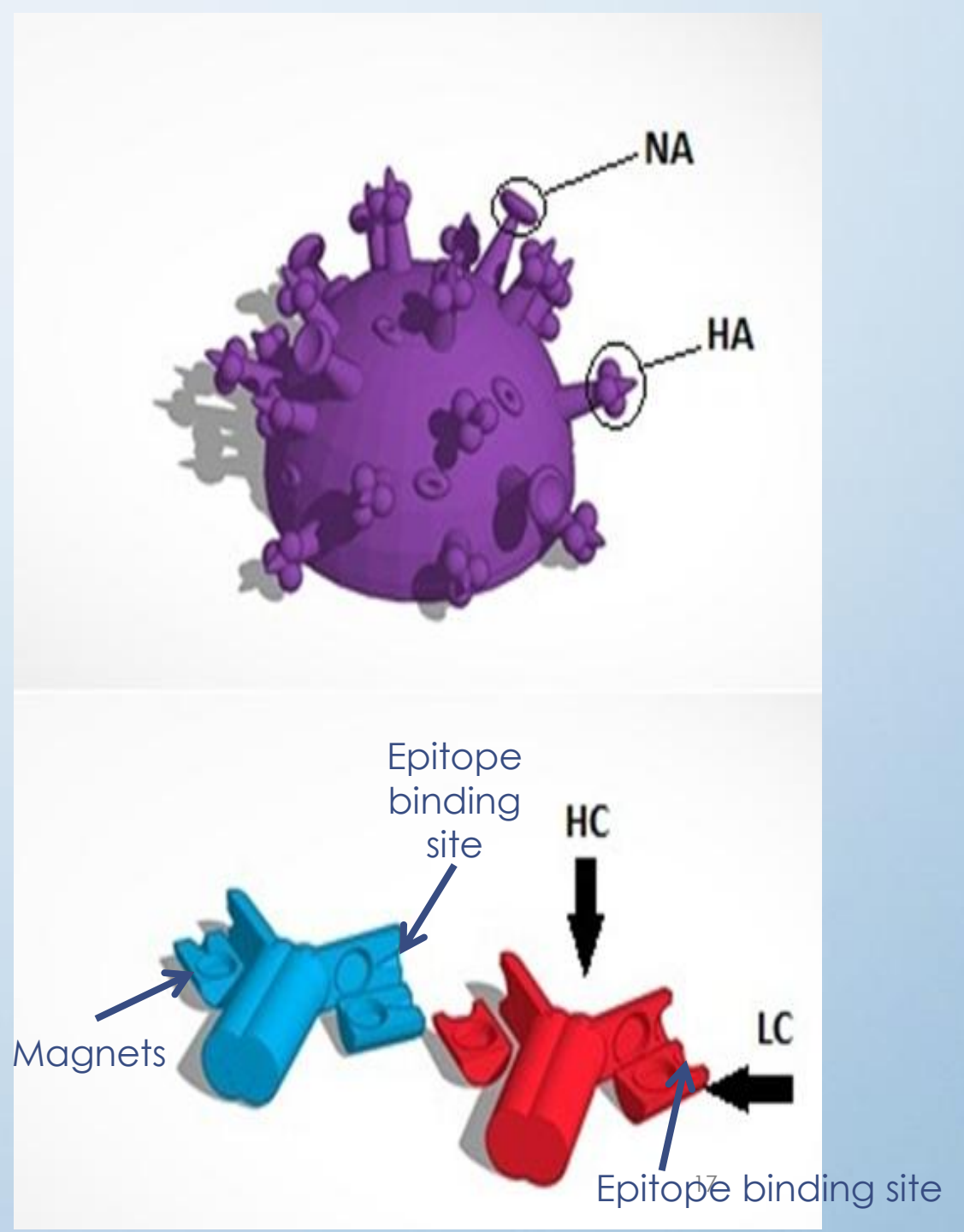
A National Training Laboratories study (2005) indicates that less than five percent of information delivered through lecture format is retained.

Antibody Epitope Activity

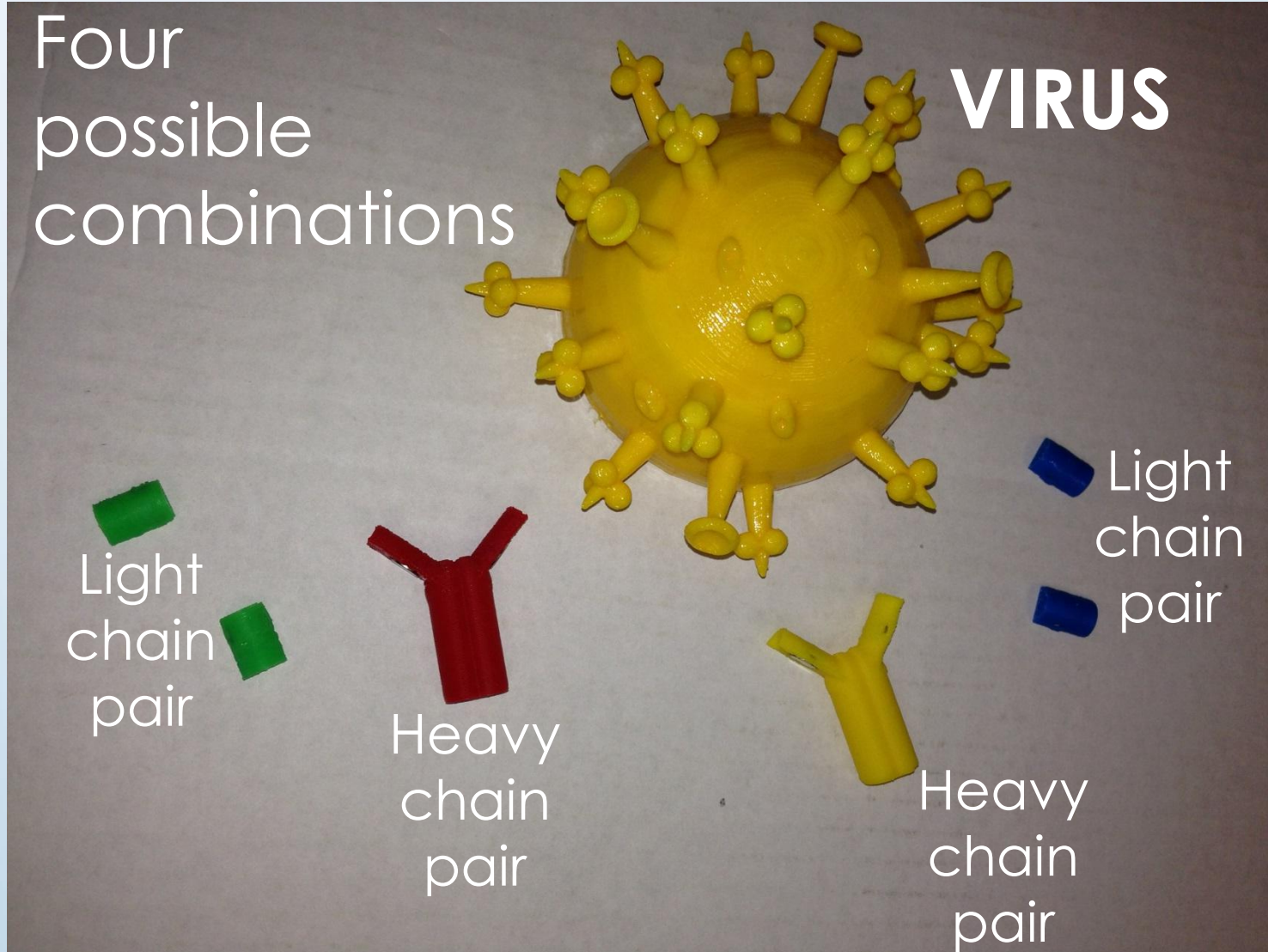
Bloom Level	Learning Goal	Learning Outcome	Activity	Assessment
3	Students will understand that one antigen can have several antibody epitopes.	Students will be able to demonstrate that one antigen can have more than one epitope	Students will match antibody light and heavy chains to corresponding epitopes on a viral antigen using 3-D printed antibody epitope models. *What alternative activity(s) is needed to achieve UDL?	Formative: clicker quiz Summative: exam questions

Our model

- Influenza A virus cross-section
 - Neuraminidase (NA)
 - Hemagglutinin (HA)
 - 4:1 HA:NA ratio
 - M2 ion channel
- 2 anti-HA antibodies
 - Anti-cone antibody
 - Anti-sphere antibody

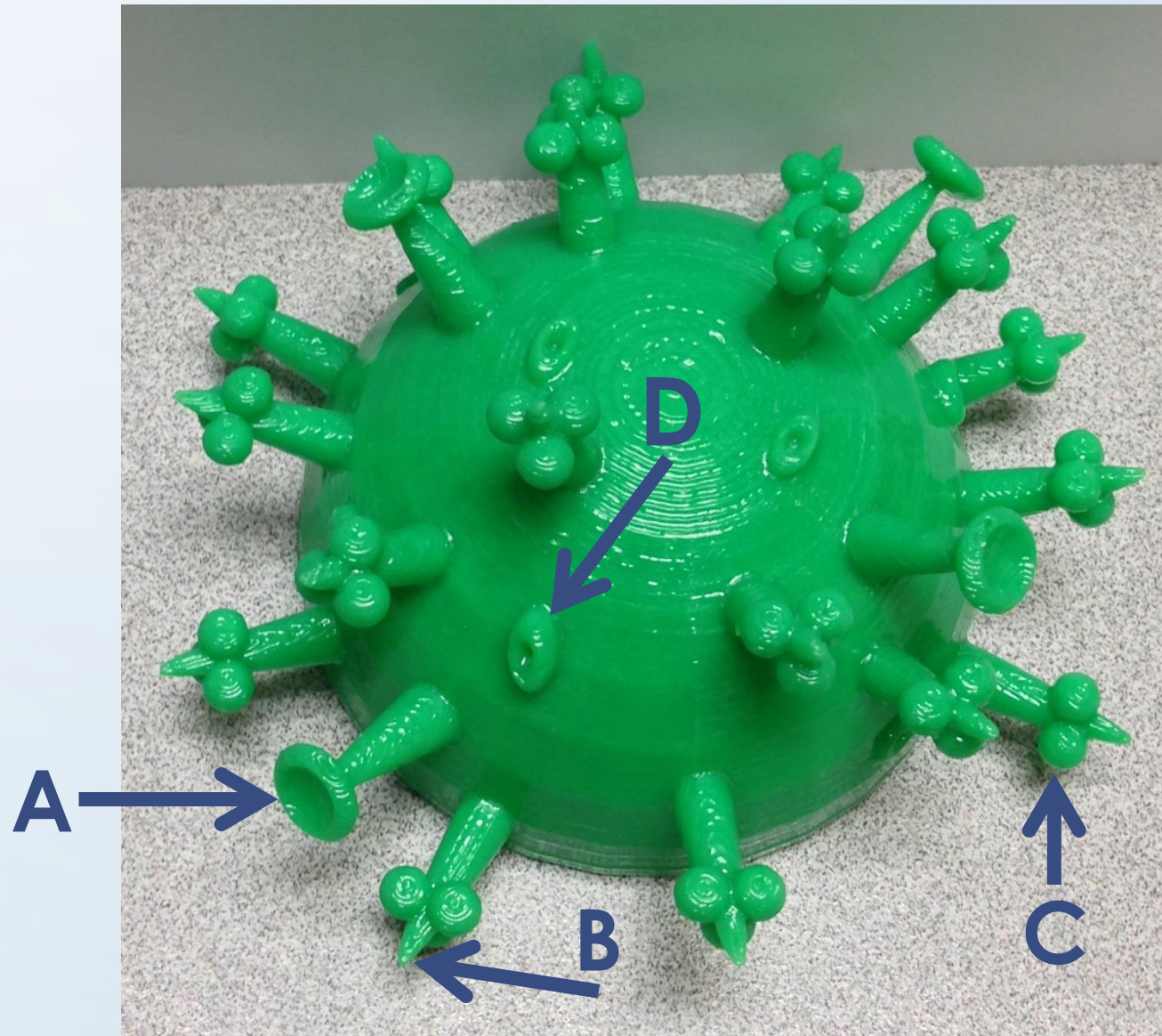


The Kit



What epitope does the combination of Heavy chain Red and light chain Green bind to?

- a. A
- b. B
- c. C
- d. D
- e. None of these



Answer: B

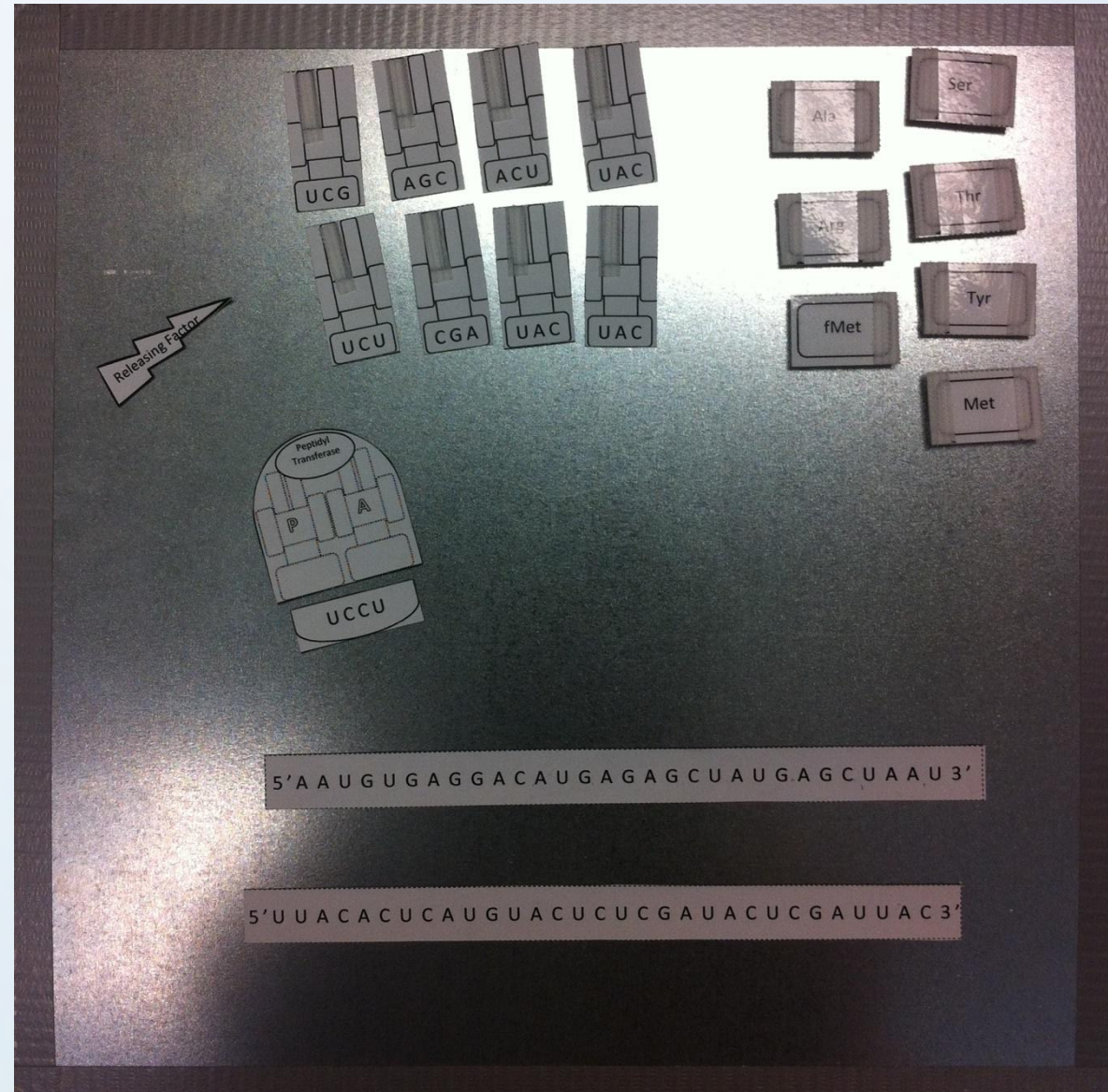
The heavy chain **Red**
and light chain **Green**
bind to epitope B



Translation Activity

Bloom Level	Learning Goal	Learning Outcome	Activity	Assessment
3	Students will understand the relationship between genes and proteins	Students will be able to generate mRNA and protein from DNA	Students will use magnets to “act out” transcription and translation to produce a protein with the correct amino acid sequence *What alternative activity(s) is needed to achieve UDL?	Formative: clicker quiz Summative: exam questions

The Kit



Metal sheet
12" x 12"
Home Depot

“RAMS”



What amino acid will aminoacyl-tRNA synthetase add to the tRNA with the anticodon sequence 3' UAC 5'?

a. Met: M

b. fMet: M_f

c. Tyr: Y

What types of active learning were employed in these activities?

- Manipulation of kit pieces
 - Because scientists are kinesthetic learners
- Groups of 3-4 students
 - Fosters “student talk” and peer teaching
- Clickers
 - Formative assessment

UDL in my course

- Lecture Capture
 - International students
 - Nontraditional students
 - Learning disabilities
- Accessibility in non-HTML content
 - Word documents
 - PDF documents
 - PowerPoint

<http://webaim.org/techniques/word/>

<http://accessibility.arl.org/standards-best-practices/>
2014 Association of Research Libraries

Examples of Word & PDF docs my students can download before class

Lysozyme -

— Enzyme found in:

— Mode of action:

Bacteria That Lack a Cell Wall

Mycoplasma species have extremely variable shape

— Cytoplasmic membrane contains sterols that increase strength

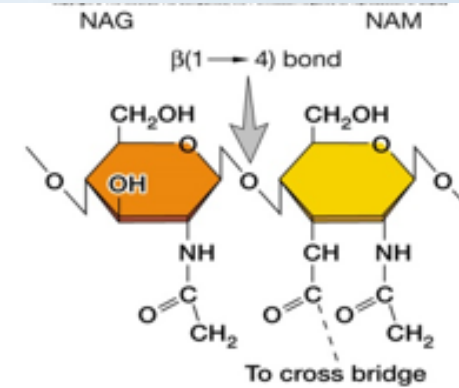


Fig. 32.3 Prescott 8th



Accessibility in Word

Word Accessibility Checker

Under File Tab

The screenshot shows the Microsoft Word interface with the File tab selected. The ribbon includes options like Info, New, Open, Save, Save As, Save as Adobe PDF, Print, Share, Export, and Close. The main area displays document information for 'Lecture 1.SP14.docx [Compatibility Mode] - Word'. The 'Info' section shows the document path: 'My Documents » Teaching » CSU » MIP 300 » McLean MIP 300 » Spring 2015 » Lectures » Lecture 1 Who Are the Microbes'. Three main tool buttons are visible: 'Convert', 'Protect Document', and 'Inspect Document'. The 'Inspect Document' button is circled in black. A tooltip for 'Inspect Document' is shown in the bottom left, also with 'Check Accessibility' circled. The 'Inspect Document' panel lists items to check: document properties, footers, hidden text, and content inaccessible to people with disabilities. The 'Properties' section on the right lists document details like size (389KB), pages (3), and words (124). The 'Related Dates' section shows the document was last modified yesterday at 5:37 PM. The 'Related People' section lists the author as Taylor, Jen and the last modified by as McLean, Je.

File Tab Options:

- Info
- New
- Open
- Save
- Save As
- Save as Adobe PDF
- Print
- Share
- Export
- Close

Document Info:

Lecture 1.SP14

My Documents » Teaching » CSU » MIP 300 » McLean MIP 300 » Spring 2015 » Lectures » Lecture 1 Who Are the Microbes

Compatibility Mode
Some new features are disabled to prevent problems when working with previous versions of Office. Converting this file will enable these features, but may result in layout changes.

Protect Document
Control what types of changes people can make to this document.

Inspect Document
Before publishing this file, be aware that it contains:

- Document properties, author's name and related dates
- Footers
- Characters formatted as hidden text
- Content that people with disabilities are unable to read

Properties

Size	389KB
Pages	3
Words	124
Total Editing Time	1268 Minutes
Title	Add a title
Tags	Add a tag
Comments	Add comments

Related Dates

Last Modified	Yesterday, 5:37 PM
Created	8/21/2011 8:49 AM
Last Printed	8/21/2011 9:41 AM

Related People

Author: Taylor, Jen
Add an author

Last Modified By: McLean, Je

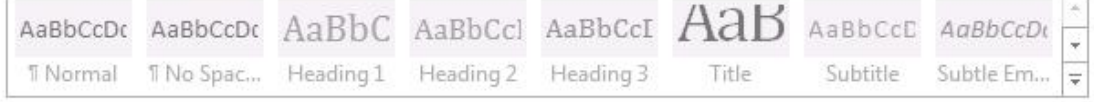
Related Documents

Open File Location

Inspect Document
Check the document for hidden properties or personal information.

Check Accessibility
Check the document for content that people with disabilities might find difficult to read.

Check Compatibility
Check for features not supported by earlier versions of Word.



Types of microbes

Prokaryotes:



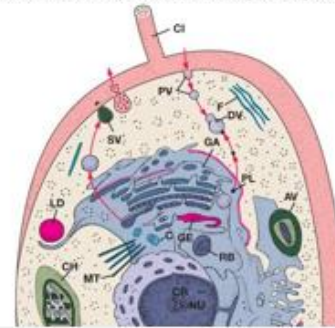
Figure 2.7a Treponema



Figure 2.8a *Pseudomonas*

Eukaryotes:

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Accessibility Checker

Inspection Results

ERRORS

- Missing Alt Text
 - Chart 1
 - Picture 2
 - Table
- No Header Row Specified
 - Table

WARNINGS

- Objects not Inline
 - TextBox 5
 - TextBox 1
 - Picture 2

Additional Information

Why Fix:

Alternate text helps readers understand information presented in pictures and other objects.

How To Fix:

To add alternate text to a picture or object:

Select and fix each issue listed above to make this document accessible for people with disabilities.

[Read more about making documents accessible](#)



Alternative text for images

- Images should be given appropriate alternative text in Word.
- This alt text will be read by a screen reader in a Word file and should remain intact when exporting to HTML or PDF.
- Many images have associated text, but it often doesn't make sense to the reader.

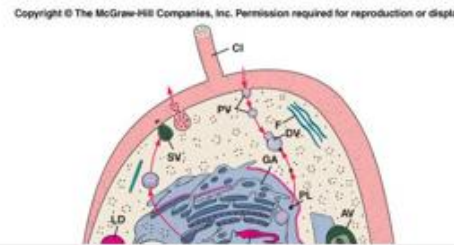
Types of microbes

Prokaryotes:

Right click on picture
Select **format picture**



Eukaryotes:



Format Picture



TEXT BOX

ALT TEXT

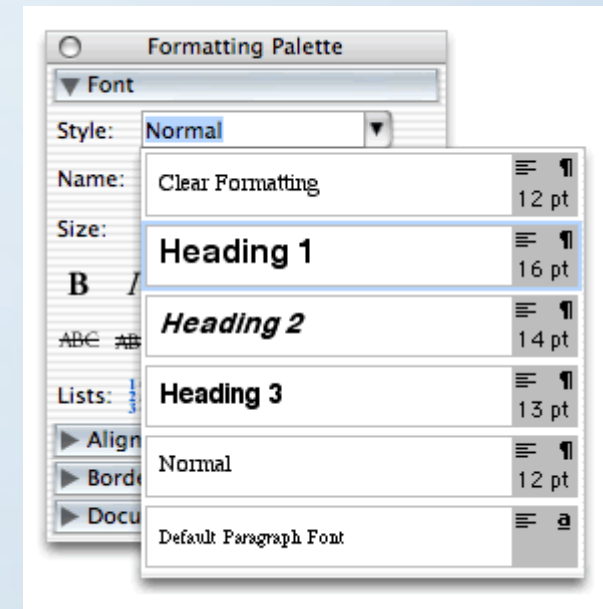
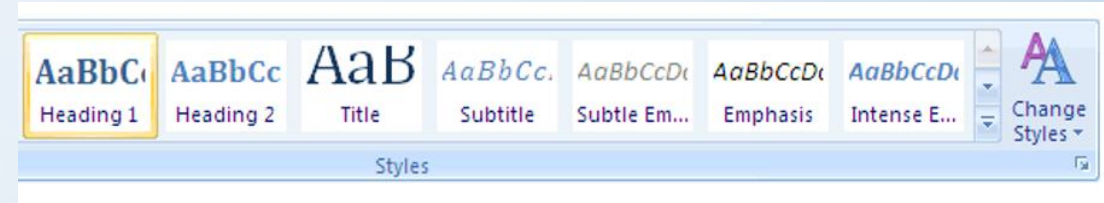
Title

Description

Treponema pallidum under dark field microscope

Headings

- Heading structure
- Many people do not use true styles in Word.
- Word styles
- Add 1st, 2nd, or 3rd level headings using **Ctrl + Alt + 1, 2, or 3** (**Cmd + Option** on a Mac).



Lecture 1.SP14.docx [Compatibility Mode] - Word

FILE HOME INSERT DESIGN PAGE LAYOUT REFERENCES MAILINGS REVIEW VIEW ACROBAT

Cambria (Head) 16 A A Aa A

B I U abc x₂ x² A ab A

AaBbCcDc AaBbCcDc AaBbCc AaBbCcI AaBbCcD AaB AaB

Normal No Spac... Heading 1 Heading 2 Heading 3 Heading 4 Title

Clipboard Font Paragraph Styles Editing

1 2 3 4 5 6 7

Types of microbes

Prokaryotes:

Eukaryotes:

Highlight text
Select heading in Word Styles toolbar
Short cut: Ctrl-Alt 1

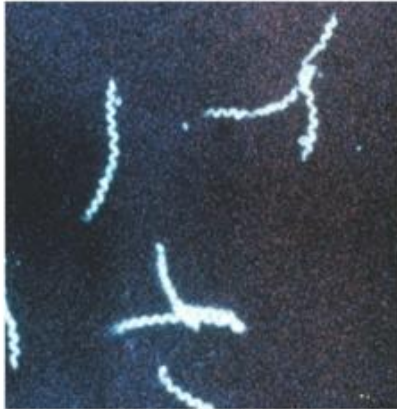


Figure 2.7a Treponema


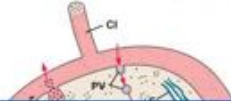


Figure 2.8a *Pseudomonas*



Select headings

Types of microbes

Prokaryotes:

Highlight text
Select heading in Word Styles toolbar
Short cut: Ctrl-Alt 1

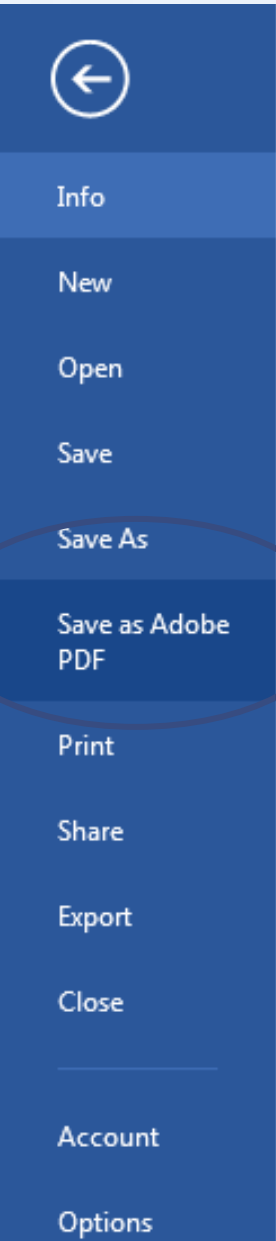
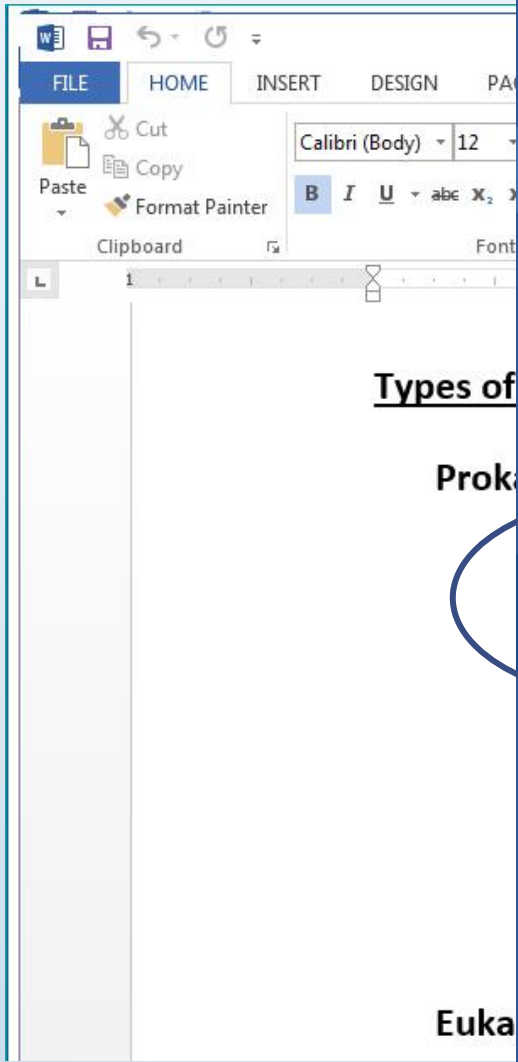
Eukaryotes:

Figure 2.7a Treponema

Figure 2.8a *Pseudomonas*

Convert Word to PDF

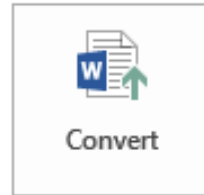
- Many Word documents end up as PDF files.
- Convenient way to preserve formatting and accessibility information, assuming the file is converted correctly.



Info

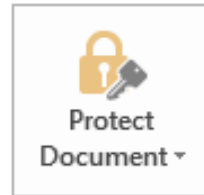
Lecture 1.SP14

My Documents » Teaching » CSU » MIP 300 » McLean



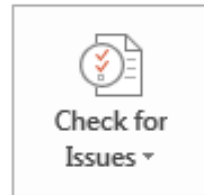
Compatibility Mode

Some new features are disabled to versions of Office. Converting this layout changes.



Protect Document

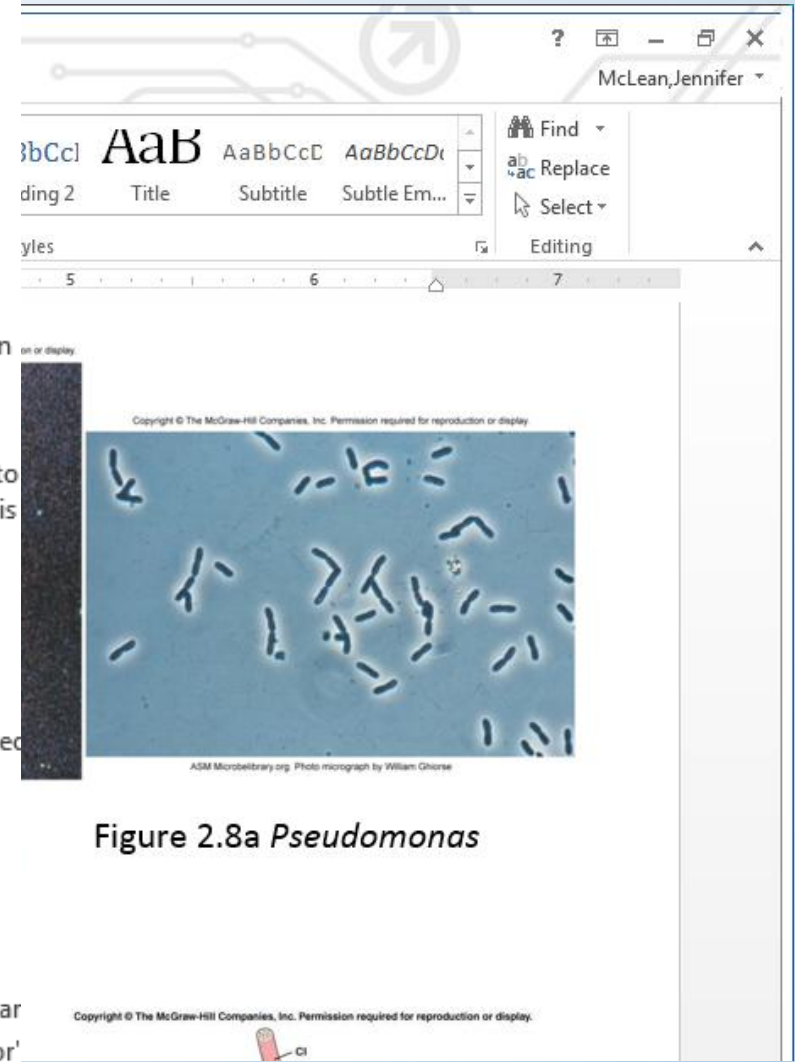
Control what types of changes people can make to this document.



Inspect Document

Before publishing this file, be aware of the following issues:

- Document properties, author information, and metadata
- Footers
- Content that people with disabilities may not be able to see or hear



Either one of these options will open the same dialog box. The program should create a tagged PDF file by default.



Acrobat PDFMaker

Settings Security Word Bookmarks

PDFMaker Settings

Conversion Settings: Standard

Use these settings to create Adobe PDF documents suitable for reliable viewing and printing of business documents. Created PDF documents can be opened with

- View Adobe PDF result
- Prompt for Adobe PDF file name
- Convert Document Information

Advanced Settings ...

PDF/A Compliance: None

Application Settings

- Attach source file
- Create Bookmarks
- Add Links
- Enable Accessibility and Reflow with tagged Adobe PDF
 - Enable advanced tagging

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Restore Defaults OK Cancel Help

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Other considerations

- Use true numbered and bulleted lists.
- Use sufficient font size (12+).
- Provide good contrast.
- Do not rely on color alone to convey meaning.
- Use true columns, not table or columns created by hand with the Tab key.
- Provide a table of contents for long documents.
- Use simple language.

Thank you!

