

# Transition to online labs at ECU

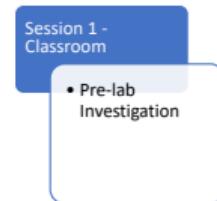
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East Carolina University

April 2, 2020

# Physics labs at ECU in BC days

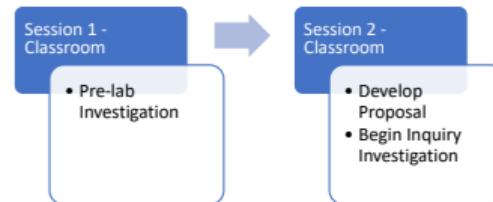
## ADI Investigation Cycle



Studying science practice transfer between disciplines

# Physics labs at ECU in BC days

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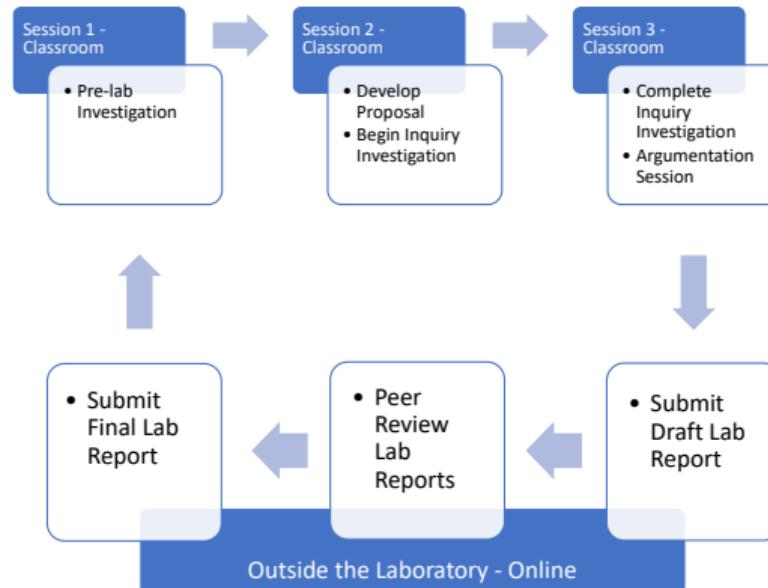
## ADI Investigation Cycle



Studying science practice transfer between disciplines

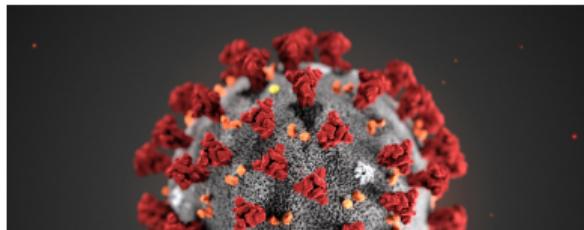
# Physics labs at ECU in BC days

## ADI Investigation Cycle



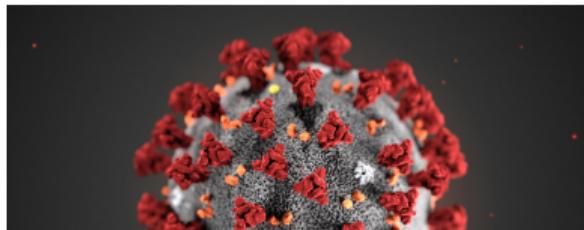
Studying science practice transfer between disciplines

# Change of plans: Labs are online now.



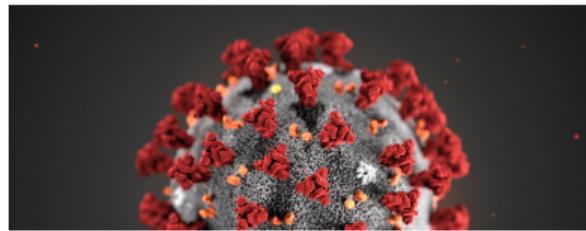
- Preserve ADI format for last two investigations

# Change of plans: Labs are online now.



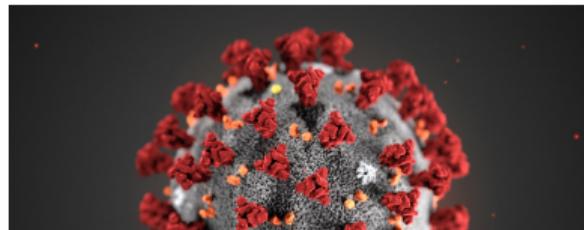
- Preserve ADI format for last two investigations
- How can we change our delivery while maintaining our focus on science practices?

# Change of plans: Labs are online now.



- Preserve ADI format for last two investigations
- How can we change our delivery while maintaining our focus on science practices?
- What do we need to do together?
  - ① Proposal approval
  - ② Argumentation session

# Change of plans: Labs are online now.



- Preserve ADI format for last two investigations
- How can we change our delivery while maintaining our focus on science practices?
- What do we need to do together?
  - ① Proposal approval
  - ② Argumentation session
- What can we do apart?
  - ① Data collection (Both Prelab and Inquiry Investigation)
  - ② Data analysis
  - ③ Peer review/lab report revision

# Implementing an ADI cycle—online delivery

The screenshot shows a WebEx interface with four participants in the top bar: EE, JR, WG, and AM. Below the bar, a slide titled "Argument" is displayed. The slide contains a table and a text block. The table has columns for Hair/Laser, Diameter (mm), Error, and Range. The text block discusses the non-significance of diameter differences between people based on percent errors.

Hair/Laser	Diameter (mm)	Error	Range
H0R	0.094	±0.0306	(.0636-.1246)
H3G	0.130	±0.0424	(.0876-.1724)
H7R	0.111	±0.0027	(.1083-.1137)
H7G	0.108	±0.0026	(.1056-.1108)

While exact values may vary, when percent errors are taken into account, the differences in diameter of hairs from different people are non-significant; therefore, hairs from different people have the same diameter.

Figure 1.2 A table containing calculated diameter, error, and range of diameter. Since the calculated top non-significant difference can be seen within the data set. It has to be concluded that that the differences in diameters of hairs from different people are non-significant.

Student presentation in WebEx argumentation session.

- Students complete pre-lab before proposal session

# Implementing an ADI cycle—online delivery

The screenshot shows a WebEx interface with four participants in the top bar: EE, JR, WG, and AM. Below the bar, a slide titled "Argument" is displayed. The slide contains a text block: "While exact values may vary, when percent errors are taken into account, the differences in diameter of hairs from different people are non-significant; therefore, hairs from different people have the same diameter." Below the text is a table:

Hair/ Laser	Diameter (mm)	Error	Range
HOR	0.094	±0.0306	(.0636-.1246)
H3G	0.130	±0.0424	(.0876-.1724)
H7R	0.111	±0.0027	(.1083-.1137)
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Student presentation in WebEx argumentation session.

- Students complete pre-lab before proposal session
- Proposal session—WebEx/Discussion Boards; approval by end of class time

# Implementing an ADI cycle—online delivery

The screenshot shows a video conference interface with four participants labeled EE, JR, WG, and AM. Below the video, a presentation slide is displayed. The slide has a title 'Argument' and a subtitle: 'While exact values may vary, when percent errors are taken into account, the differences in diameter of hairs from different people are non-significant; therefore, hairs from different people have the same diameter.' Below the subtitle is a table with the following data:

Hair/ Laser	Diameter (mm)	Error	Range
HOR	0.094	±0.0306	(.0636-.1246)
H3G	0.130	±0.0424	(.0876-.1724)
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Student presentation in WebEx argumentation session.

- Students complete pre-lab before proposal session
- Proposal session—WebEx/Discussion Boards; approval by end of class time
- Measurements/Analysis—Group completes before next lab session

# Implementing an ADI cycle—online delivery

The screenshot shows a WebEx interface with four participants in the top bar: EE, JR, WG, and AM. Below the bar, a presentation slide is displayed. The slide has a title 'Argument' and a subtitle: 'While exact values may vary, when percent errors are taken into account, the differences in diameter of hairs from different people are non-significant; therefore, hairs from different people have the same diameter.' Below the subtitle is a table with four rows. The table has four columns: Hair/Laser, Diameter (mm), Error, and Range. The data is as follows:

Hair/Laser	Diameter (mm)	Error	Range
HOR	0.094	±0.0306	(.0636-.1246)
H3G	0.130	±0.0424	(.0876-.1724)
H7R	0.111	±0.0027	(.1083-.1137)
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To the right of the table is a caption: 'Figure 1.2 A table containing calculated diameter, error, and range of diameter. Since the error bars overlap, no significant difference can be seen within the data set. It has to be concluded that that the differences in diameters of hairs from different people are non-significant.'

Student presentation in WebEx argumentation session.

- Students complete pre-lab before proposal session
- Proposal session—WebEx/Discussion Boards; approval by end of class time
- Measurements/Analysis—Group completes before next lab session
- Argumentation—3 slide PPT on WebEx during class time

# Implementing an ADI cycle—online delivery

The screenshot shows a WebEx interface with four participants in the top bar: EE (green), JR (purple), WG (yellow), and AM (orange). Below the bar, a presentation slide is displayed. The slide has a title 'Argument' and a subtitle: 'While exact values may vary, when percent errors are taken into account, the differences in diameter of hairs from different people are non-significant; therefore, hairs from different people have the same diameter.' Below the subtitle is a table:

Hair/ Laser	Diameter (mm)	Error	Range
HOR	0.094	±0.0306	(.0636- .1246)
H3G	0.130	±0.0424	(.0876- .1724)
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Figure 1.2 A table containing calculated diameter, error, and range of diameter. Since no significant difference can be seen within the data set, it has to be concluded that that the differences in diameters of hairs from different people are non-significant.

Student presentation in WebEx argumentation session.

- Students complete pre-lab before proposal session
- Proposal session—WebEx/Discussion Boards; approval by end of class time
- Measurements/Analysis—Group completes before next lab session
- Argumentation—3 slide PPT on WebEx during class time
- Peer Review—asynchronous, online (same as in BC times)

# Measurements and Simulations



Image of diffraction pattern for student measurement.

- Measurements online using photos and video
- Simulations on *Trinket*

# Tools used in online lab delivery

Tool	Use	Rationale
Canvas	Material, Assignments, Quizzes, Discussions	University LMS
WebEx	Class introduction, argumentation, group interactions (???)	University supported
Peergrade.io	Online peer review	Anonymous reviews and feedback; better than Canvas
Trinket.io	Simulations embedded in Canvas	Fine-grained control