

# IAQ Mold Assessments: More Than Just A Test

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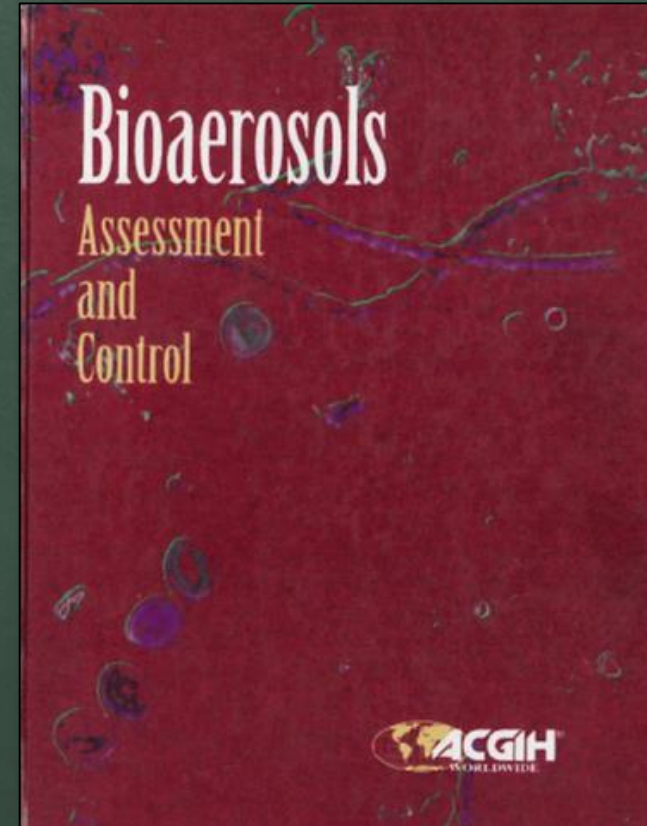
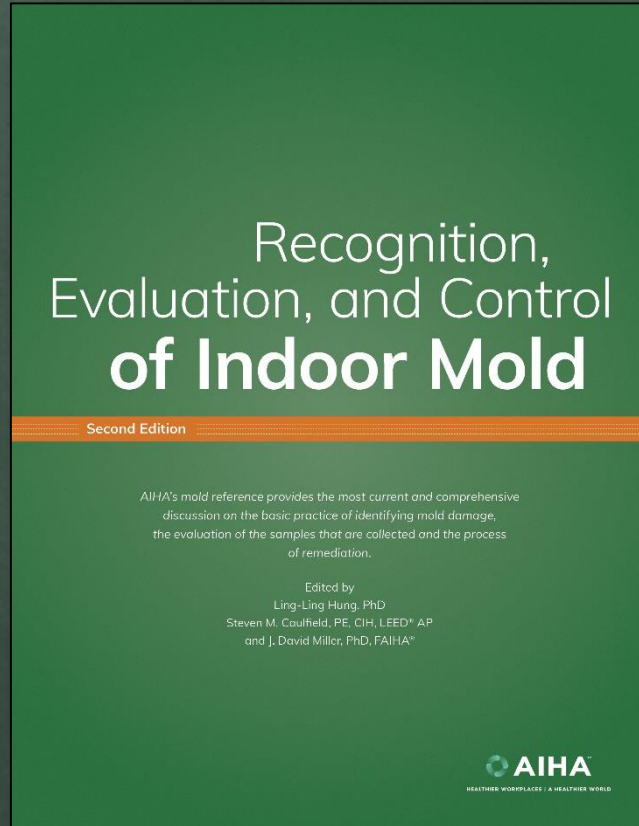
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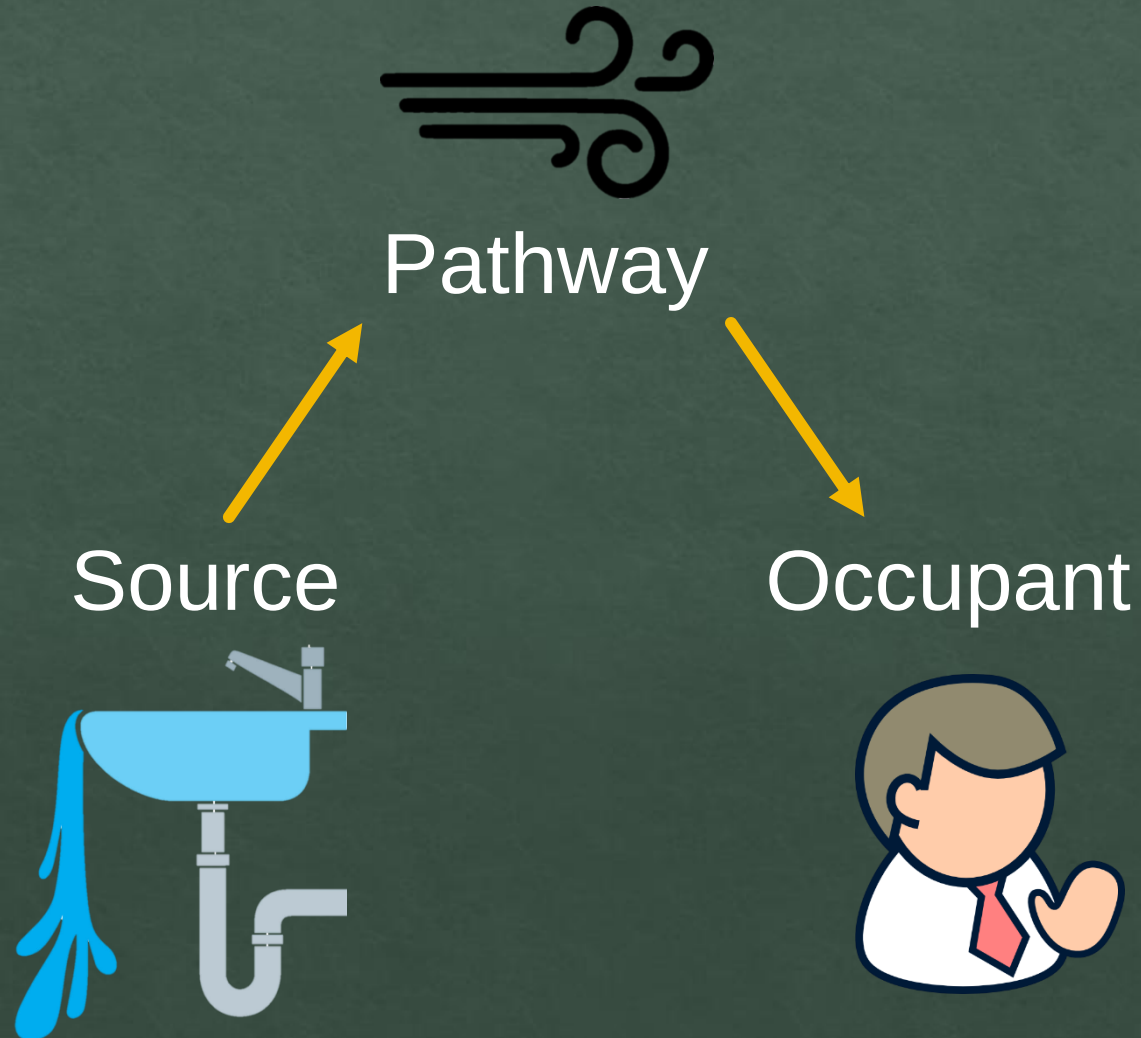
# Review of Topics

- Intro to IAQ Mold Assessments
- Gather Information
- Formulate Hypotheses
- Test Hypotheses - Observation/Sampling Plan
- Test Hypotheses - Interpreting Data
- Make Recommendations

# Guidance Documents



# Intro to IAQ Mold Assessments

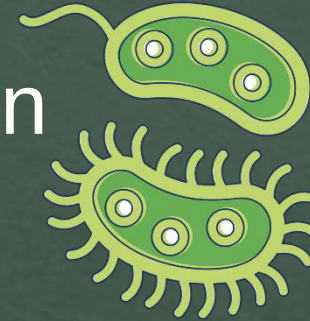


# Intro to IAQ Mold Assessments



Occupant

Allergen



Environment



# Intro to IAQ Mold Assessments

1

Gather  
Information

2

Formulate  
Hypotheses

3

Test Hypotheses

4

Make  
Recommendations

# Gather Information

1



# 1. Gather Information

## Identify Client Goals

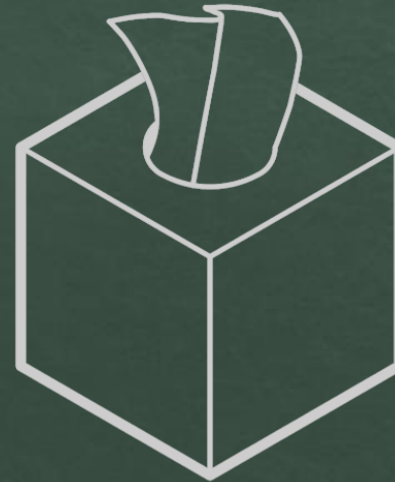
- Solve or prevent a health issue
- Fix a building problem
- Convince a court



# 1. Gather Information

## Health Assessment

- Symptoms?
- Hospital records?



# 1. Gather Information

## Maintenance Assessment

- What is currently being done or has been done?
- Previous water events?
- Renovations/weatherization



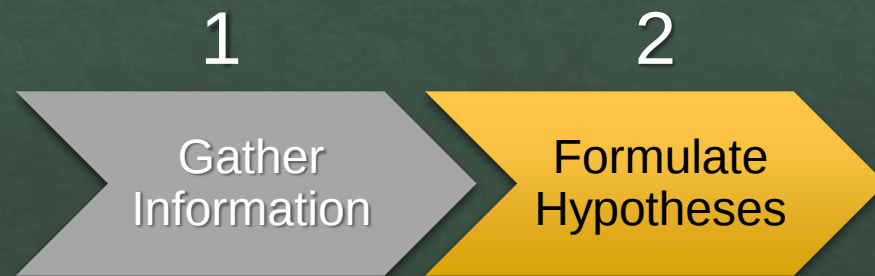
# 1. Gather Information

## Building Assessment

- Floorplan and drawings review
- Building walk-through



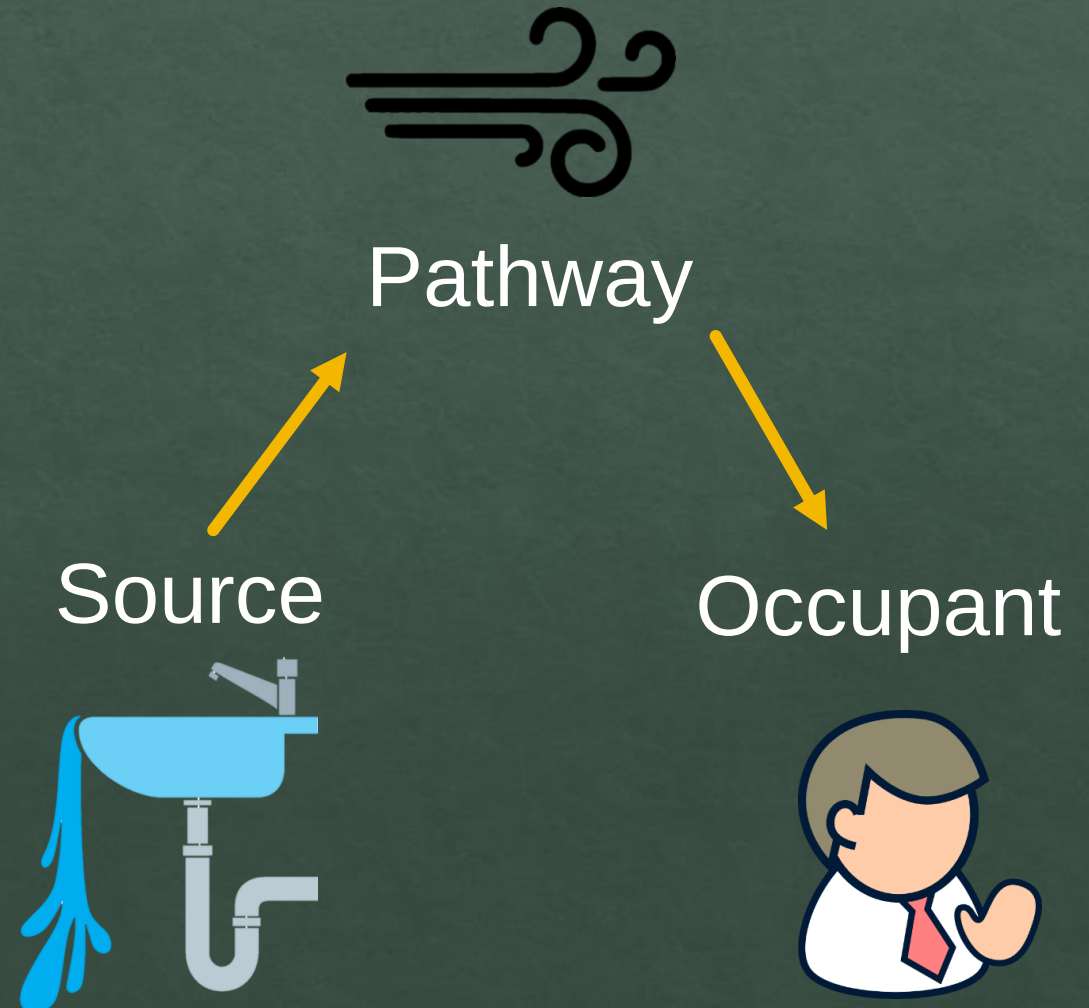
# Formulate Hypotheses



## 2. Formulate Hypotheses

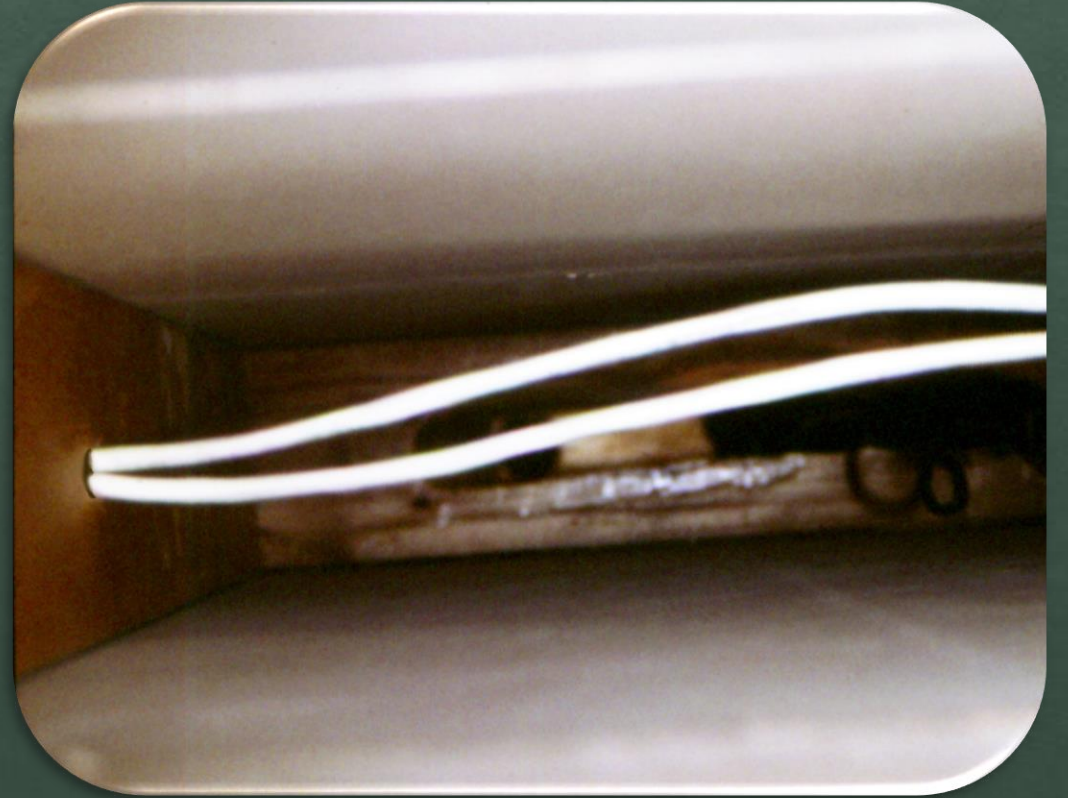
### Create Theories

- Possible agents - fungi
- Possible sources - moisture
- Possible pathways - air flow

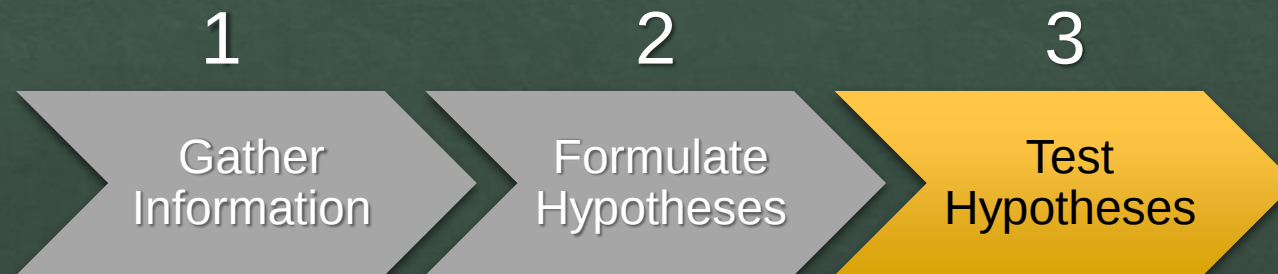


## 2. Formulate Hypotheses

### Example Pathways



# Test Hypotheses



### 3. Test Hypotheses - Observation/Sampling Plan

#### Create Observation/Sampling Plan

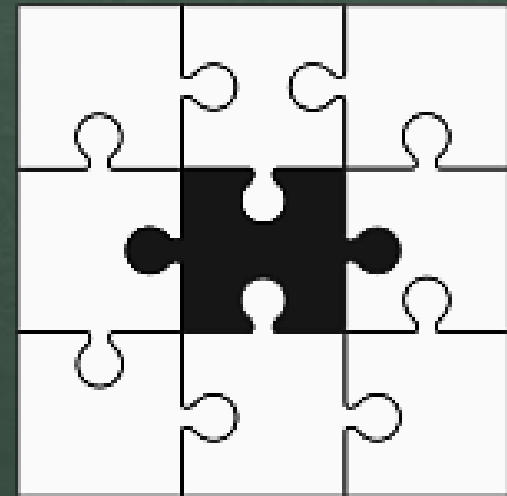
- Determine the Tools & Supplies
- Determine Where & When
- Quality Control



# 3. Test Hypotheses - Interpreting Data

## Data Assessment

- Review Results
- Review Information Gathered
- Connect the Dots



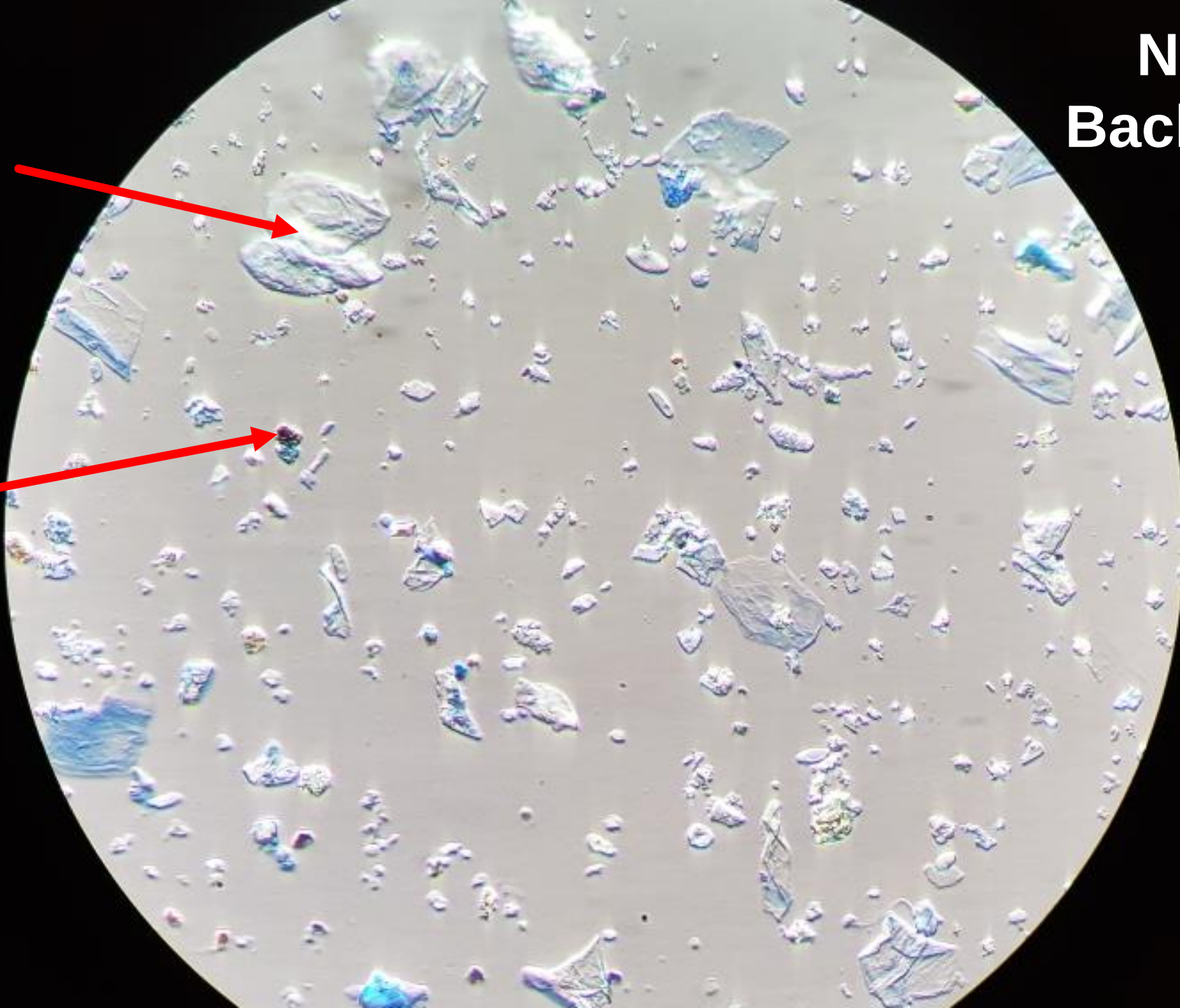
### 3. Test Hypotheses - Interpreting Data

| Lab ID Number                                                                         | Sample Type | Description                 | Background Debris* | Mold Growth ** | Comments |
|---------------------------------------------------------------------------------------|-------------|-----------------------------|--------------------|----------------|----------|
| 10181103                                                                              | TAPE LIFT   | A - Master Bathroom Ceiling | 4                  | Not Detected   |          |
| 10181104                                                                              | TAPE LIFT   | B - Master Bathroom Floor   | 5                  | 5 Cladosporium |          |
| 10181105                                                                              | SWAB        | C - Master Bathroom Window  | 3                  | 1 Cladosporium |          |
| Qualitative Scale: 1 = lowest (very low abundance); 5 = highest (very high abundance) |             |                             |                    |                |          |

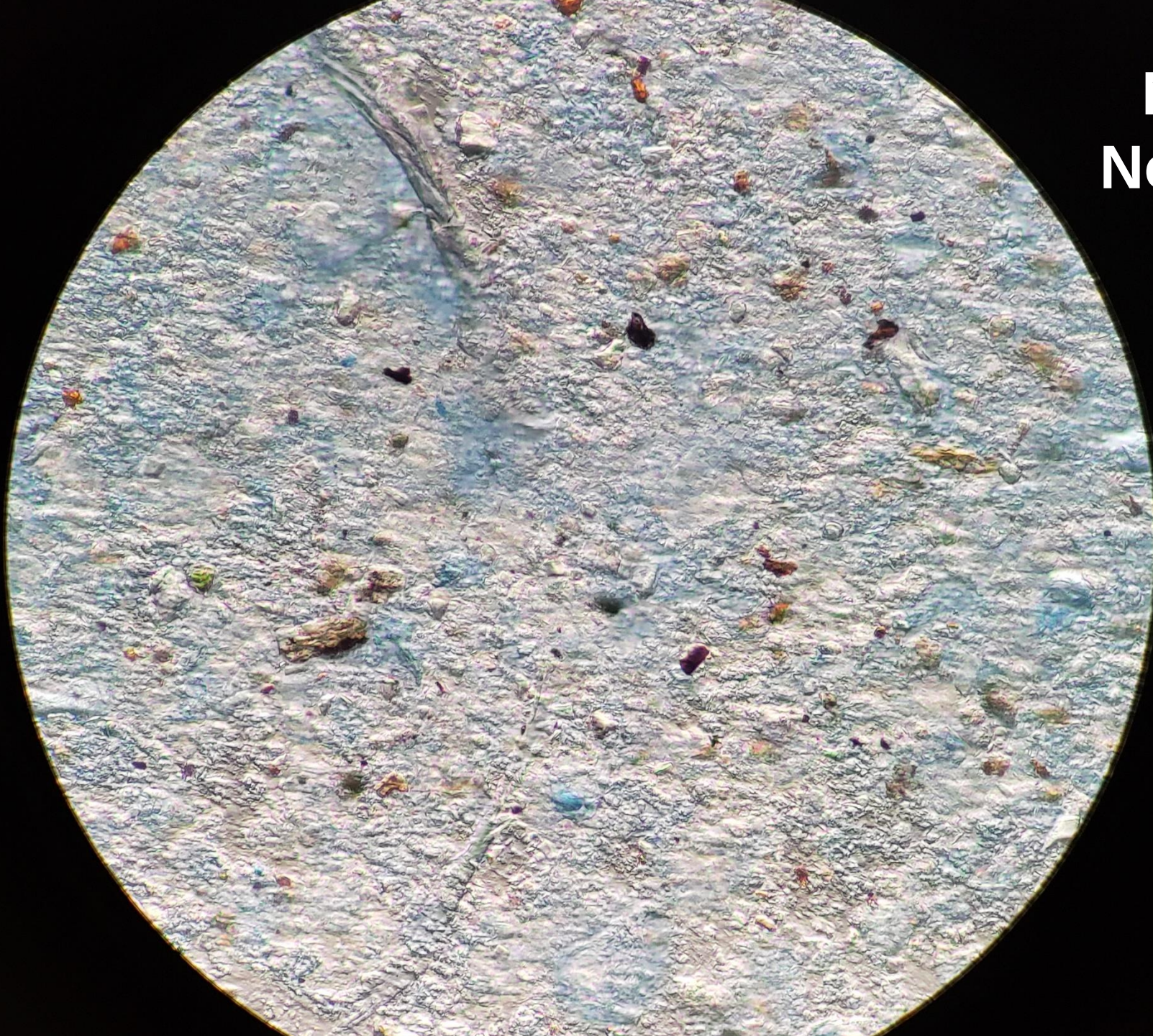
Skin Cell

Normal  
Background

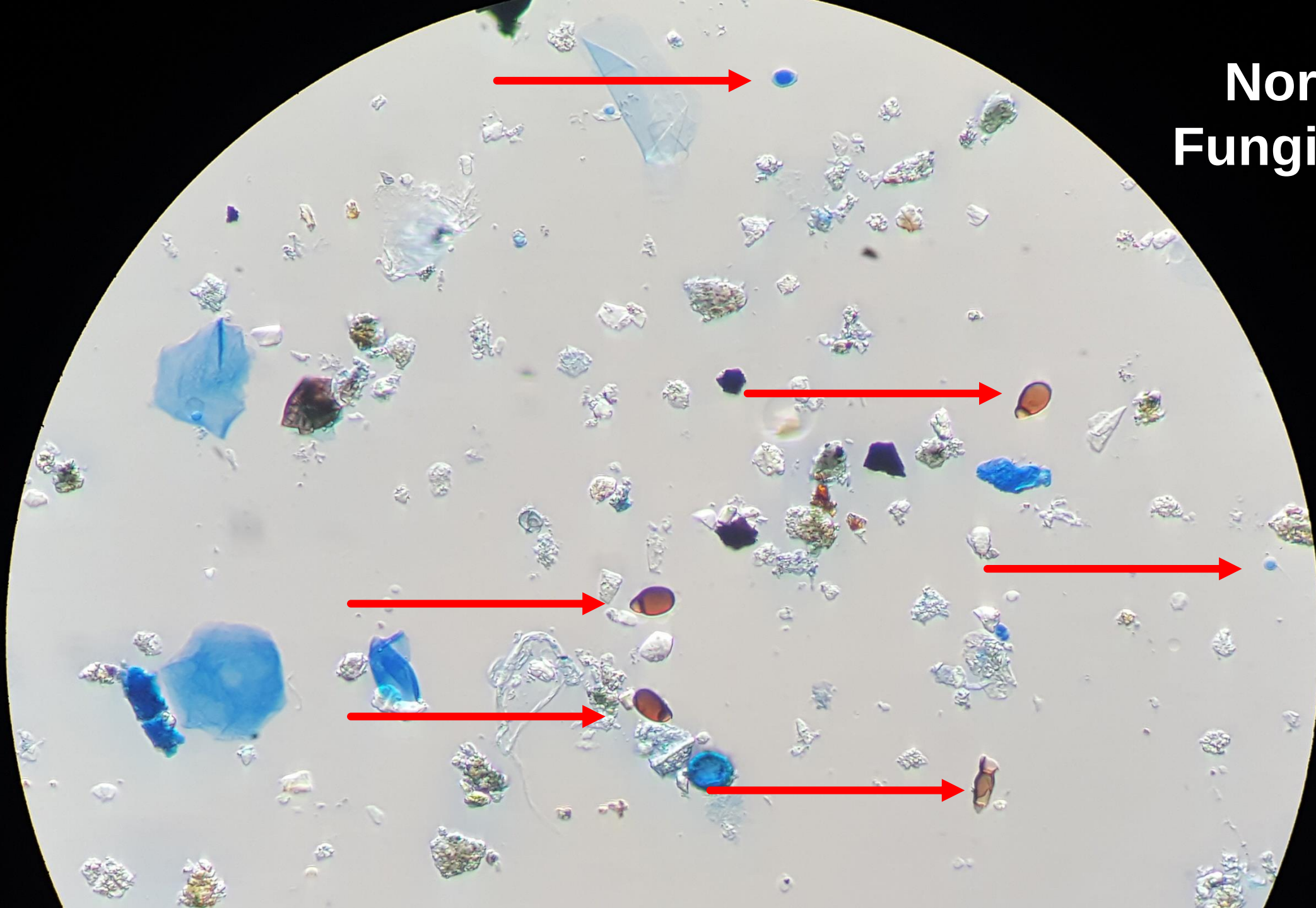
Black  
Opaque



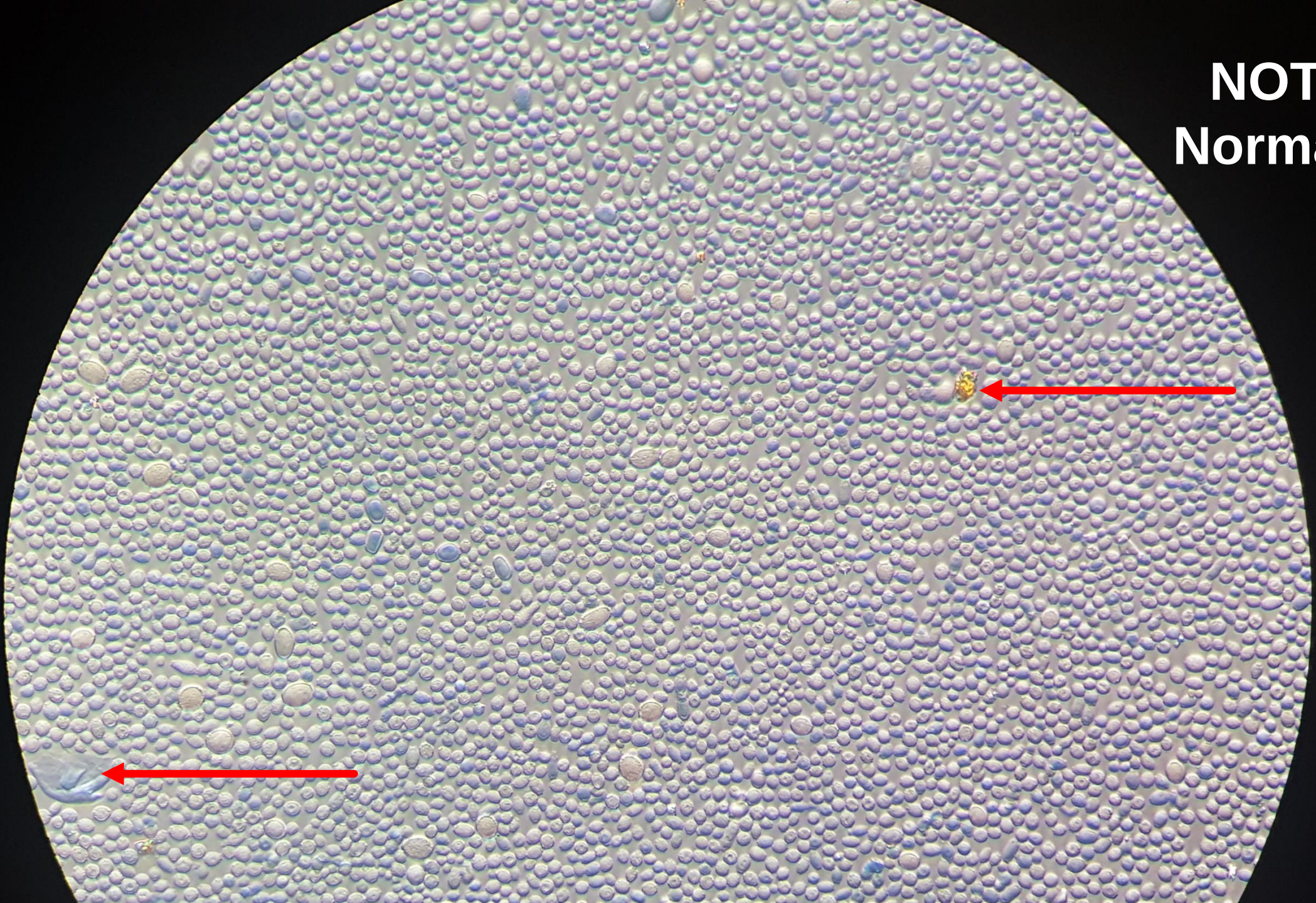
**NOT  
Normal**



**Normal  
Fungi Load**



**NOT  
Normal**



# 3. Test Hypotheses - Interpreting Data

| Sample Description                       | Outdoor      |                | Indoor       |               |
|------------------------------------------|--------------|----------------|--------------|---------------|
| Lab ID Number                            | 101910000    |                | 101910001    |               |
| Volume Sampled (Liters)                  | 75           |                | 75           |               |
| Background Debris*                       | 2            |                | 4            |               |
|                                          |              |                |              |               |
|                                          | Raw Ct.      | Ct./m3         | Raw Ct.      | Ct./m3        |
| <b>Total Mold Spores &amp; Fragments</b> | <b>2,000</b> | <b>110,000</b> | <b>1,000</b> | <b>49,000</b> |
| Alternaria                               |              |                |              |               |
| Ascospores                               | 500          | 27,000         |              |               |
| Aspergillus/Penicillium-like             |              |                | 800          | 43,000        |
| Basidiospores                            | 500          | 27,000         |              |               |
| Bipolaris Group                          |              |                |              |               |
| Chaetomium                               |              |                |              |               |
| Chlamydospores                           |              |                |              |               |
| Cladosporium                             | 400          | 21,000         |              |               |
| Curvularia                               | 400          | 21,000         |              |               |
| Epicoccum                                |              |                |              |               |
| Fusarium                                 |              |                |              |               |
| Hyphal Fragments                         |              |                | 100          | 5,300         |
| Myxomycetes/Smuts/Periconia              | 100          | 5,300          |              |               |
| Other Spores                             |              |                |              |               |
| Pithomyces                               | 100          | 5,300          |              |               |
| Poria/Meruliporia                        |              |                |              |               |
| Rusts                                    |              |                |              |               |
| Stachybotrys                             |              |                | 100          | 1,300         |
| Trichoderma                              |              |                |              |               |
| Ulocladium                               |              |                |              |               |
| Unknown Spores                           |              |                |              |               |
| Zygomycetes                              |              |                |              |               |

Total counts are misleading.

# 3. Test Hypotheses - Interpreting Data

| Sample Description                       | Outdoor    |               | Living Room |              | Basement     |                |
|------------------------------------------|------------|---------------|-------------|--------------|--------------|----------------|
| Lab ID Number                            | 101910007  |               | 101910008   |              | 101910009    |                |
| Volume Sampled (Liters)                  | 75         |               | 75          |              | 75           |                |
| Background Debris*                       | 3          |               | 3           |              | 4            |                |
|                                          |            |               |             |              |              |                |
|                                          | Raw Ct.    | Ct./m3        | Raw Ct.     | Ct./m3       | Raw Ct.      | Ct./m3         |
| <b>Total Mold Spores &amp; Fragments</b> | <b>413</b> | <b>22,000</b> | <b>77</b>   | <b>4,100</b> | <b>2,461</b> | <b>130,000</b> |
| Alternaria                               |            |               |             |              |              |                |
| Ascospores                               | 196        | 10,000        | 17          | 910          | 70           | 3,700          |
| Aspergillus/Penicillium-like             | 5          | 270           | 50          | 2,700        | 2,240        | 120,000        |
| Basidiospores                            | 124        | 6,600         | 8           | 430          | 66           | 3,500          |
| Bipolaris Group                          |            |               |             |              |              |                |
| Chaetomium                               |            |               |             |              |              |                |
| Chlamydospores                           |            |               |             |              |              |                |
| Cladosporium                             | 76         | 4,100         | 2           | 110          | 59           | 3,100          |
| Curvularia                               | 2          | 110           |             |              | 1            | 53             |
| Epicoccum                                |            |               |             |              |              |                |
| Fusarium                                 |            |               |             |              |              |                |
| Hyphal Fragments                         |            |               |             |              | 17           | 910            |
| Myxomycetes/Smuts/Periconia              | 7          | 370           |             |              |              |                |
| Other Spores                             |            |               |             |              |              |                |
| Pithomyces                               | 2          | 110           |             |              |              |                |
| Poria/Meruliporia                        |            |               |             |              |              |                |
| Rusts                                    |            |               |             |              |              |                |
| Stachybotrys                             |            |               |             |              | 8            | 110            |
| Trichoderma                              |            |               |             |              |              |                |
| Ulocladium                               |            |               |             |              |              |                |
| Unknown Spores                           | 1          | 53            |             |              |              |                |
| Zygomycetes                              |            |               |             |              |              |                |

Follow the spores and look for hyphal fragments.

# 3. Test Hypotheses - Interpreting Data

| Sample Description                       | Outdoor    |               | Indoor    |            |
|------------------------------------------|------------|---------------|-----------|------------|
| Lab ID Number                            | 101910002  |               | 101910003 |            |
| Volume Sampled (Liters)                  | 75         |               | 75        |            |
| Background Debris*                       | 3          |               | 2         |            |
|                                          |            |               |           |            |
|                                          | Raw Ct.    | Ct./m³        | Raw Ct.   | Ct./m³     |
| <b>Total Mold Spores &amp; Fragments</b> | <b>201</b> | <b>11,000</b> | <b>16</b> | <b>690</b> |
| Alternaria                               |            |               |           |            |
| Ascospores                               | 85         | 4,500         | 1         | 53         |
| Aspergillus/Penicillium-like             | 13         | 690           | 11        | 590        |
| Basidiospores                            | 79         | 4,200         |           |            |
| Bipolaris Group                          |            |               |           |            |
| Chaetomium                               |            |               | 1         | 13         |
| Chlamydospores                           |            |               |           |            |
| Cladosporium                             | 14         | 750           |           |            |
| Curvularia                               | 1          | 53            |           |            |
| Epicoccum                                | 1          | 53            |           |            |
| Fusarium                                 |            |               |           |            |
| Hyphal Fragments                         |            |               |           |            |
| Myxomycetes/Smuts/Periconia              | 8          | 430           |           |            |
| Other Spores                             |            |               |           |            |
| Pithomyces                               |            |               |           |            |
| Poria/Meruliporia                        |            |               |           |            |
| Rusts                                    |            |               |           |            |
| Stachybotrys                             |            |               | 3         | 40         |
| Trichodema                               |            |               |           |            |
| Ulocladium                               |            |               |           |            |
| Unknown Spores                           |            |               |           |            |
| Zygomycetes                              |            |               |           |            |

**Remember mycology.**

Raw count of 1 spore could originate anywhere, but many spores could indicate growth.

# 3. Test Hypotheses - Interpreting Data

| Sample Description                       | Outdoor    |               | Living Room |               | Bathroom     |                |
|------------------------------------------|------------|---------------|-------------|---------------|--------------|----------------|
| Lab ID Number                            | 101910004  |               | 101910005   |               | 101910006    |                |
| Volume Sampled (Liters)                  | 75         |               | 75          |               | 75           |                |
| Background Debris*                       | 2          |               | 5           |               | 2            |                |
|                                          |            |               |             |               |              |                |
|                                          | Raw Ct.    | Ct./m3        | Raw Ct.     | Ct./m3        | Raw Ct.      | Ct./m3         |
| <b>Total Mold Spores &amp; Fragments</b> | <b>208</b> | <b>11,000</b> | <b>227</b>  | <b>12,000</b> | <b>1,923</b> | <b>100,000</b> |
| Alternaria                               | 2          | 110           |             |               |              |                |
| Ascospores                               | 60         | 3,200         | 56          | 3,000         | 40           | 2,100          |
| Aspergillus/Penicillium-like             |            |               | 52          | 2,800         | 50           | 2,700          |
| Basidiospores                            | 100        | 5,300         | 48          | 2,600         | 22           | 1,200          |
| Bipolaris Group                          |            |               |             |               |              |                |
| Chaetomium                               |            |               |             |               |              |                |
| Chlamydospores                           |            |               |             |               |              |                |
| Cladosporium                             | 22         | 1,200         | 70          | 3,700         | 1,811        | 97,000         |
| Curvularia                               |            |               |             |               |              |                |
| Epicoccum                                | 6          | 320           |             |               |              |                |
| Fusarium                                 |            |               |             |               |              |                |
| Hyphal Fragments                         |            |               |             |               |              |                |
| Myxomycetes/Smuts/Periconia              | 18         | 960           | 1           | 53            |              |                |
| Other Spores                             |            |               |             |               |              |                |
| Pithomyces                               |            |               |             |               |              |                |
| Poria/Meruliporia                        |            |               |             |               |              |                |
| Rusts                                    |            |               |             |               |              |                |
| Stachybotrys                             |            |               |             |               |              |                |
| Trichoderma                              |            |               |             |               |              |                |
| Ulocladium                               |            |               |             |               |              |                |
| Unknown Spores                           |            |               |             |               |              |                |
| Zygomycetes                              |            |               |             |               |              |                |

Keep the inspection in mind.

Window was open in the bathroom and it was a windy dry day.

Background debris levels.

# Make Recommendations

1

Gather  
Information

2

Formulate  
Hypotheses

3

Test Hypotheses

4

Make  
Recommendations

## 4. Make Recommendations

### Repair & Replace

- Repair or replace all damaged materials (DIY or hire)

### Prevention

- Maintenance plan
- What identifies further issues



# Presenter Contact Information

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# Disclaimer

- This presentation is not intended to be a comprehensive program covering all aspects of this topic.
- All are participants are encouraged to read and follow applicable standards, codes and regulations related to this topic.
- The views and opinions following are the presenter's opinions and not necessarily the official position of the Maine IAQ Council, IAQnet LLC, or Healthy Indoors.