# Elaborate: Code Blue: Crack the Case Before It's Too Late

INSTRUCTOR: no\_reply@example.com

#### SYSTEMS CHECK: EMERGENCY MEDICAL ROUND

#### Objective

You will act as student medical interns to diagnose patients by figuring out which body systems are involved based on their symptoms, test results, and system interactions. Your job is to apply your knowledge, look for clues, and explain how different body systems are working together—or failing.

#### Background

The human body is made of many systems. Each system has a job, but none of them work alone. For example:

- The circulatory system moves blood, oxygen, and nutrients.
- The respiratory system brings oxygen into the body and removes carbon dioxide.
- The digestive system breaks down food and absorbs nutrients.
- The immune system helps protect the body from germs.
- The lymphatic system filters body fluids and helps the immune system.

When one system is not working right, other systems may be affected. This is called a system interaction. In this activity, you will diagnose fictional patients by identifying their symptoms, using test results, and explaining which systems are interacting and why.

#### INSTRUCTIONS

You will rotate through 8 patient stations. Each station has a fictional case file. You will:

- 1. Read the patient's story and symptoms
- 2. Study the test results and notes







- 3. Use evidence to figure out which systems are involved
- 4. Explain how the systems are connected
- 5. Share your findings as a medical team

### **Patient Investigation Log**

#### Step 1: What symptoms do you see?

• I notice symptoms like \_\_\_\_\_. This could mean the \_\_\_\_\_ system is affected.

#### Step 2: What systems are probably involved?

These symptoms suggest a problem with the \_\_\_\_\_ and \_\_\_\_\_ systems because
\_\_\_\_\_.

#### Step 3: How are these systems supposed to work together?

- Normally, the \_\_\_\_\_ helps the \_\_\_\_\_ by \_\_\_\_\_.
- In this case, it seems that \_\_\_\_\_ is not happening, which causes \_\_\_\_\_.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

#### Step 4: What evidence supports your diagnosis?

- According to the bloodwork or tests, I see \_\_\_\_\_, which shows \_\_\_\_\_.
- This makes me think the systems involved are \_\_\_\_\_ and \_\_\_\_\_.

#### Final Diagnosis - Medical Team Report

After completing all stations, pick one case file to present as a team.

#### Presentation Frame:

- Our team diagnosed the patient with a problem involving the \_\_\_\_\_ and \_\_\_\_\_ systems.
- We believe this because of symptoms like \_\_\_\_\_ and test results showing \_\_\_\_\_.
- These systems work together by \_\_\_\_\_, but in this case, \_\_\_\_\_ is going wrong.

Name:	Date:			
Connect and Reflect				
Reflection 1: What system was the easiest to recognize when disrupted? Why?				
I noticed the system easily because	,			

Reflection 2: What was the most surprising system interaction you learned about?

I was surprised that the \_\_\_\_\_ system works so closely with the \_\_\_\_\_ system
 because \_\_\_\_\_.

Reflection 3: How does this simulation help you think like a scientist or doctor?

This activity helped me think like a scientist because I had to \_\_\_\_\_, and \_\_\_\_\_.

Nama	
Name:	

**Reflection 4:** If you were designing a new case file, what symptoms would you include, and what systems would they affect?

• I would create a case where the patient has \_\_\_\_\_, which could affect the \_\_\_\_\_ and \_\_\_\_\_ systems.



Date:







# Nina K Patient History:

Nina got back from hiking with her friends and noticed her eyes looked a little yellow. Her stomach felt bloated, and a few days later, her pee turned dark. She thought she might be dehydrated, but it didn't go away. Diagnostic Data:

- Bilirubin Level: 4.0 mg/dL (high)
- Red Blood Cell Count: Low
- Urine Color: Dark amber
- Liver Enzyme Panel: ALT and AST elevated

Patient: Nina K.



# Eli S.

# Patient History:

Eli has been training hard for swim team but has started feeling weak and tired even after eating big meals. He's lost weight, gets stomach cramps, and spends a lot of time in the bathroom. His coach told him to rest, but it hasn't helped.

Diagnostic Data:

- Vitamin D and Iron: Low
- White Blood Cell Count: Low
- Stool Test: Mucus and undigested food present
- Endoscopy: Inflammation in small intestine



Normal 400/µL range 10/uL 4000-11,000 00,000/µL 1500-5000 4,500,000\_ di 6,500,000 13-18 40-54 76-96 1/41 150,000\_ 450,000 negative 70-110 171-302 21-385 136-146 3.7-5.5 4.3-4.9 -8 5-4.0 -45 1-1.5

Amber Y.

Patient History: Amber thought she had a cold, but her cough got worse, and her chest began hurting when she breathed. She started coughing up thick mucus and got a fever that wouldn't go away. Her mom took her to urgent care after a rough night.

Diagnostic Data:

- Temperature: 102.5°F
- White Blood Cell Count: 20,000/mcL

(high)

- Sputum Test: Positive for bacterial infection
- Chest CT: Swelling in the lungs





Mateo D.

Patient History: Mateo helped his uncle move boxes all day, and his ankles looked swollen that evening. He felt very tired and had trouble sleeping lying down. At first, he thought he was sore, but the swelling got worse over several days. Diagnostic Data:

- BNP (Heart Stress Marker): 650 pg/mL (very high)
- Albumin (Protein): Low
- Blood Pressure: 90/60 (low)
- Echocardiogram: Heart working harder than normal

Patient: Mateo D.



# Lesson Title : Code Blue: Crack the Case Before It's Too Late

### **Grade Level:**

High School Biology

(Level: TEKS-aligned; accessible at a 5th-grade reading level for inclusion and equity)

# **Objective:**

Students will analyze case-based data to determine how body systems interact and affect one another when disrupted by illness or injury. They will identify the systems involved, provide evidence for their reasoning, and communicate their diagnosis using academic vocabulary.

# **Materials Needed:**

- Printed or digital patient case files (8 total)
- Student diagnosis log sheets (one per patient)
- Large chart paper or whiteboards (optional for group presentations)
- Timer or clock for rotation management
- Sticky notes or mini "system tags" (for formative assessment exit strategy)

#### Lesson Duration: 60 minutes

#### Lesson Breakdown:

#### 0–10 minutes | Hook & Opener Activity Title: "Uh Oh... What Happened to Jordan?"

NL	2	$\sim$	<u>~·</u>
IN	aı	11	е.

- Display a brief version of **Jordan T.'s backstory** on the board or read it aloud dramatically.
- Ask: "You are the medical intern. What questions would you ask? What body systems do you think might be involved?"

#### Think-Pair-Share Prompt:

"Based on the story, what do you already notice about how different systems might be connected?"

#### **Transition Statement:**

"You'll rotate through real patient stories just like this one. You'll have to think like a doctor, analyze test results, and use what you know about the body to figure out what's happening."

#### 10–15 minutes | Directions & Setup

#### **Teacher Instructions:**

- Divide students into groups of 3-4 (based on reading and teamwork skills)
- Assign groups to different starting stations (1–8)
- Each station has a patient case file and diagnosis log
- Students rotate every 5-6 minutes through different patients

#### Explain the task:

• "At each station, read the case, look at the test data, and complete the diagnosis log. Decide which body systems are involved and how they're connected."

#### 15–45 minutes | Case File Rotation & Analysis Student Task:

Investigate 3–4 patient stations, completing the **Diagnosis Log** at each. **Student Diagnosis Log (per patient):** 

- 1. What symptoms does the patient have?
- 2. Which body systems might be involved?
- 3. How do these systems normally help each other?
- 4. What do the test results suggest?
- 5. What is your group's best guess based on the evidence?

#### **Teacher Role:**

- Walk around to monitor progress
- Ask clarifying questions:

- "How do these symptoms relate to what the system does?"
- "What does this test result tell you?"
- "Could there be more than one system affected?"

#### 45–55 minutes | Group Share or Case Report Out

#### Option A – Gallery Walk (Silent Share):

- Students leave sticky notes or "system diagnosis" slips at each case file
- Rotate to see what other teams decided and compare diagnoses

#### Option B – Verbal Report Out (Fast Round):

- Each group selects one patient and presents:
  - "This patient had issues with the \_\_\_\_ and \_\_\_\_ systems because \_\_\_\_. We saw evidence in \_\_\_\_ and think \_\_\_\_ is happening."

#### 55–60 minutes | Closure & Exit Reflection

#### Exit Ticket (written or oral):

Answer one guiding reflection question (see below). Collect as formative data.

#### Guiding Questions (Writing or Discussion Prompts):

- 1. Which body system was easiest for you to identify? Why?
- 2. How did the test data help you decide which systems were involved?
- 3. Which two systems worked together in one of the cases you studied?
- 4. What surprised you about how body systems can affect each other?
- 5. If you could design a new case file, what symptoms and systems would you include?

Name:			

#### Engagement Strategies:

- **Role Play Language**: Call students "interns," use clipboards or lab coats to gamify the experience
- Station Competition: "Which group will correctly diagnose the most cases today?"
- **Gallery Walk**: Use sticky notes with student-generated symptoms and diagnoses at each station
- Mystery Badge Reveal: When students guess the correct systems, hand out badges or stickers

#### Differentiation Strategies:

#### For Students with Gaps in Knowledge:

- Provide a Body Systems Quick Reference Chart at each station
- Allow them to rotate through just 2 case files in more detail with teacher assistance
- Use color-coded diagrams showing what each system does

#### For Special Education Students:

- Pair with supportive peer or instructional aide
- Use highlighted or simplified version of each case file
- Sentence stems provided on their own log sheet
- Optional verbal response in lieu of written answer

#### For English Language Learners (EB Students):

- Offer bilingual vocabulary cards (e.g., "lungs = pulmones")
- Allow extra time at stations
- Include icons or visual symbols for each body system on handouts
- Let students respond using labeled diagrams instead of full sentences if needed

#### **Optional Extensions (For Future Days or Early Finishers):**

- Students create their own case file with fictional symptoms and diagnostic data
- Write a "Doctor's Note" explaining the system interaction
- Build a body system model showing where the breakdown occurs

17

Science