UNIT: FIRST AID

ACT-Based Math: Burn Severity Percentage Calculation

### Here are ACT-aligned math activities for First Aid Kits that help students apply real-world skills in measurement, dosage calculations, and data interpretation relevant to emergency care.

### Objective:

Students will estimate the total body surface area affected by burns using the "Rule of Nines."

MATERIALS NEEDED:

* Human body diagram
* Percentage charts

Instructions:

**Goal:**  
You will apply math skills to real-life emergency situations by calculating the percentage of the body affected by burns using the "Rule of Nines." This helps emergency responders quickly estimate burn severity and make informed decisions.

**Step 1: Understand the "Rule of Nines"**

1. Review the **Rule of Nines Chart** provided. It shows how much of the body (in percentages) is covered by different regions.
2. **Memorize or refer to** the chart as needed during the activity.

| **Body Part** | **% TBSA** |
| --- | --- |
| Head & Neck | 9% |
| Each Arm (front/back) | 9% (4.5% per side) |
| Each Leg (front/back) | 18% (9% per side) |
| Front Torso | 18% |
| Back Torso | 18% |
| Perineum | 1% |

**Step 2: Label the Human Body Diagram**

1. Use the **provided diagram** to label each body region with the correct percentage.
2. Color-code or shade regions as you work through each patient scenario.

**Step 3: Apply Math to Patient Scenarios**

For each scenario:

1. **Identify the burned areas.** Use the diagram to locate them.
2. **Add the percentages** of the affected areas to calculate the **Total Body Surface Area (TBSA)** affected.
3. Determine the burn severity level using this guide:
   * **Mild:** Less than 10% TBSA (in most cases, not life-threatening)
   * **Moderate:** 10–20% TBSA (may need medical treatment)
   * **Severe:** Over 20% TBSA (often requires hospitalization or emergency care)

**Step 4: Record and Justify Your Answers**

1. Fill in your worksheet with the **total percentage**, the **classification** (mild, moderate, severe), and a **brief explanation** of why.
2. For severe burns, explain **why hospitalization or advanced care** might be necessary.

**Human Body Diagram & Percentage Charts Worksheet**

**Instructions:**

1. Review the **Rule of Nines** chart, which estimates the total body surface area (TBSA) affected by burns.
2. Label different sections of the human body using the provided diagram.
3. Apply percentage calculations to determine burn severity for each patient scenario.

**Rule of Nines Chart (Total Body Surface Area - TBSA)**

|  |  |
| --- | --- |
| Body Part | Percentage of TBSA |
| Head & Neck | 9% |
| Each Arm (front & back) | 9% (4.5% per side) |
| Each Leg (front & back) | 18% (9% per side) |
| Front Torso | 18% |
| Back Torso | 18% |
| Perineum | 1% |

**Human Body Diagram**

* (A labeled human body diagram with designated percentage regions for burns.) \*

**Patient Scenarios**

**Scenario 1: Minor Burn Injury**

A patient has burns covering their left arm (4.5%) and half of their back (9%).

* What is their total burned body surface area?
* Is this classified as a mild, moderate, or severe burn?

**Scenario 2: Extensive Burn Case**

A patient has burns covering their right leg (18%) and front torso (18%).

* Calculate their total burned percentage.
* Would this patient require hospitalization? Why or why not?

## ACT-Style QuestionS:

## A patient has burns covering the front of both legs (18%) and the back of their left arm (4.5%). What percentage of their body is burned?

## 18%

## 22.5%

## 27%

## 31.5%

## A patient has burns covering the right arm (9%) and half the left leg (9%). What percentage of their body is burned?

## 9%

## 13.5%

## 18%

## 22.5%

## **⚡ Why These Activities and Questions Matter**

By engaging in writing-based activities connected to JCI Building Systems, students:

✅ Practice organizing technical information into clear, structured arguments.  
✅ Strengthen their ability to explain HVAC and smart building concepts in writing.  
✅ Develop persuasive and analytical writing skills using real-world topics like energy efficiency and automation.

These skills mirror the ACT Writing requirements—helping students become confident, effective communicators prepared for college and STEM careers.