Burns and Wounds Lab

Name _____

Date _____

Period _____

mrsajdak.com/burns · © Ryan Sajdak · CC BY-NC-SA 4.0

BURNS A **burn** is skin killed by heat. Two things decide how bad it is: how **deep** it goes and how **much** skin it covers.

☐ I can use data to explain how the temperature and the time of contact decide how deep a burn goes.

☐ I can tell a first-, second- and third-degree burn apart from its signs, and measure a burn with the rule of nines.

Part 1. Heat and time (Tab 1)

SEP 3 Investigating · SEP 4 Data · SEP 5 Math · CCC Cause and Effect

Set **Time on the skin** to **10 min**, **Adult**, first aid **Nothing**. Change only the water. Press **Run**. Copy from **Your runs**.

1. How long until the water burns?

Water	104°F	120°F	130°F	140°F	180°F	212°F
2nd degree after						
3rd degree after						

2. A water heater is turned down from 140°F to 120°F. Change the 120°F time to seconds: _____ s. Now a second-degree burn takes _____ times as long (_____ ÷ _____).

3. The _____°F water never burned. Read the dashed red line on the graph: cells start to die above _____°F.

4. 140°F. 3rd degree after: adult _____, small child _____. Read the ruler: the dermis ends at _____ mm in the adult and _____ mm in the child.

5. A fair test of first aid. Boiling water, 10 s, adult. Change only the first aid.

First aid	Dead after 2 min (mm)	Dead 2 days later (mm)	Burn, 2 days later
Nothing			
Cool running water			
Ice			
Butter			

READ FIRST. In the lab, find the **Learn It** box under the drawing and read it. Then answer 6.

6. (a) Use **conduction** and your Q4 ruler numbers to explain why the child's skin burns through sooner. (b) Which first aid is best? Give two numbers as evidence. Use what happens after the water stops to explain why butter is the worst.

Part 2. Read the burn (Tab 2)

SEP 4 Data · SEP 6 Explanations · CCC Patterns · Structure and Function

7. Use all four tools on each burn. Then classify it. (Case 6: test the **middle**.)

Case	Looks	Blisters?	Color returns in	Pain (0 to 10)	Degree
1. Beach day					
2. Pasta water					
3. House fire					
4. Hot pan handle					
5. Curling iron					
6. Exhaust pipe					

8. A first-degree burn hurts only the _____. A second-degree burn reaches into the _____. A third-degree burn goes all the way through the _____.

9. The deepest burns hurt the least. Explain why. Use what you know is inside the dermis.

Part 3. Rule of nines (Tab 3)

SEP 2 Models · SEP 5 Math · CCC Scale, Proportion and Quantity

10. Adult, front + back. Head and neck _____% · each arm _____% · each leg _____% · the trunk _____%

11. Paint each patient. Press **Check my painting**. Copy from **Your patients**.

Patient	Burn that counts (%)	Fluid, first 24 h (mL)	First 8 h (mL)	How serious
1. Fryer oil				
2. Campfire				
3. Sunburn				
4. Soup pot (child)				

12. Patient 1: 4 mL × _____ kg × _____% = _____ mL. Switch to **Small child**. Head and neck: adult _____%, child _____%. Each leg: adult _____%, child _____%.

READ FIRST. In the lab, find the **Learn It** box under the drawing and read it. Then answer 13.

13. (a) Patient 3 is burned over 27% of his skin, but 0% counts. Use the word **dermis** to explain why. (b) Use your Q12 numbers and how bodies grow to explain why the rule of nines changes for a small child.

WOUNDS A **wound** is a break in the skin, or under it. Healing happens in four stages, and the cells do the work.

☐ I can name six kinds of wounds from how they were made and how they look.

☐ I can put the four stages of healing in order and tell what the cells do in each one.

Part 4. Six wounds (Tab 4)

SEP 2 Models · SEP 4 Data · CCC Cause and Effect · Structure and Function

14. Make a wound. Make all six. Press **Record** after each one.

How it happened	Wound	Deepest layer	Edges	Bleeding	Infection risk
Slid on pavement					
Sliced by broken glass					
Fell on a jagged rock					
Stepped on a nail					
Caught in a machine					
Hit by a baseball					

READ FIRST. In the lab, find the **Learn It** box under the drawing and read it. Then answer 15 and 16.

15. The puncture bled the least, but its risk of infection is the highest. Use what bleeding does to a wound to explain how both can be true.

16. Mystery wounds. 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____

17. Bruise clock. Record each day. A bruise on a patient is green. About how old is it? _____ days

Day	0	3	6	8	12
Color					
Pigment					

Part 5. Heal it (Tab 5)

SEP 3 Investigating · SEP 4 Data · CCC Stability and Change · Cause and Effect

18. Run a **Deep cut**, **Stitches**, **Clean and covered**. Watch the cells and the graph.

Stage	Its job, in plain words	The cells or parts doing the work
1. Hemostasis		
2. Inflammation		
3. Proliferation		
4. Remodeling		

19. A fair test of care. Deep cut, **Left open**. Change only the care.

Care	Skin closed (day)	Inflammation over (day)	Scar (mm)	Strength on day 21
Clean and covered				
Left to dry				
Dirty				

20. A friend says, "Let a cut air out so it scabs over. It heals faster." Use two numbers to answer.

21. Deep cut, stitches, clean and covered. Strength on day 7 _____ · day 21 _____ · day 90 _____ · 1 year _____. Stitches come out near day 7. Why must the cut still be protected? Does a scar ever get back to 100%?

22. Clean and covered. Compare a scrape with a third-degree burn.

Wound	Skin closed (day)	Scar (mm)
Scrape		
Third-degree burn, left open		
Third-degree burn, skin graft		

Wrap it up

SEP 6 Explanations · SEP 7 Argument · CCC Structure and Function

READ FIRST. In the lab, find the **Learn It** box under the drawing and read it. Then answer 23.

23. Claim: how deep a burn or a wound goes decides how it heals. Give **evidence** from Part 2 and from Question 22. For your **reasoning**, use where new skin grows from.

NYSSLS: building toward HS-LS1-2, HS-LS1-3 and HS-LS1-4. Hole's Essentials 6.4 (skin functions, wound healing) and its feature on burns (AP.3.6.7). Burn times follow the scald measurements of Moritz and Henriques (1947). The days, cell counts and scar widths in Part 5 are from a model made to show the pattern; they are not medical values. SEP = Science and Engineering Practice, CCC = Crosscutting Concept.