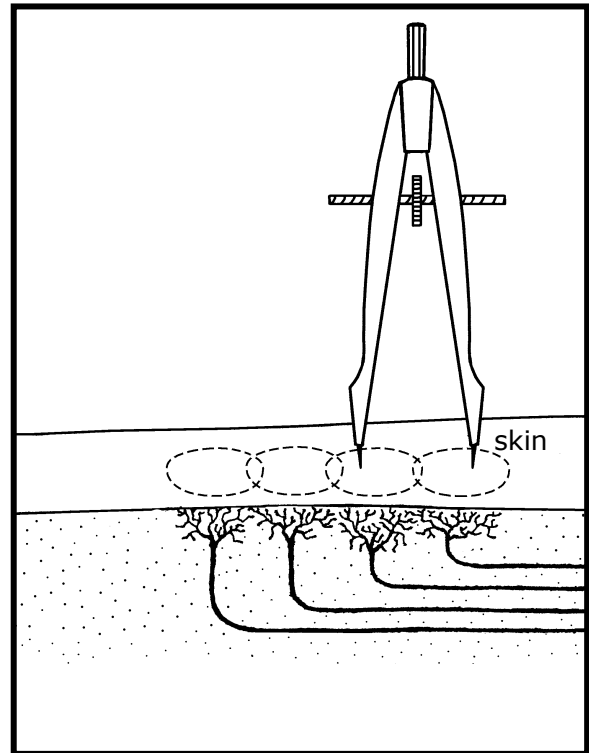
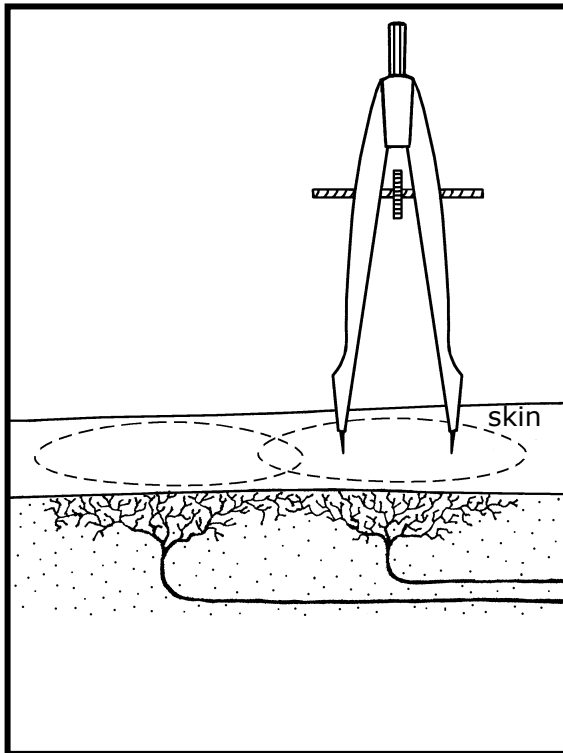


INVESTIGATING NEURON SENSORY FIELDS

Plan for a biology practical for Class 10-12 or BSc level

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Give the students a pair of dividers (like the ones shown) and blank page with the above two diagrams and ask them to work in pairs to figure out the meaning of the pictures and to ask some research questions and devise plans for experiments to conduct on each other in order to find answers.

Let them work together for 10 minutes, then share with the whole class their ideas.

Now ask a student to come to the front of the class. Tell the student to look away. Touch the student with the dividers on their hand or arm and ask them to tell whether they were touched by one or two points. The class should see that they give the wrong answer.

Then ask the students to frame research questions in order to investigate some question related to this. Ask them to first write down a complete research plan, including a focussed research question, a hypothesis, identified independent, dependent, and controlled variables, and a method by which the variables are controlled and sufficient data is collected.

After correcting their plans, the students should carry out their investigations and write reports on the results and conclusions, including statistical calculations, and also including further research in their books and on the internet in order to check the validity of their conclusions. They should also be encouraged to ask further questions which occur to them as a result of this investigation. Careful note taking should be carried out at the time of the investigations.

Finally, the entire class should compare and discuss their questions, results and conclusions.

[an alternative: Use the following handout]

SKIN SENSITIVITY

You can feel a pin prick because your skin contains sensory neurons. The area covered by each sensory neuron (its 'sensory field') varies. On some parts of the skin there are a large number of sensory neurons, and in other parts there are fewer neurons covering an equal area. Maybe our skin doesn't need to be so sensitive in some areas, so it has fewer neurons there. Which parts do you think need to have more sensation?

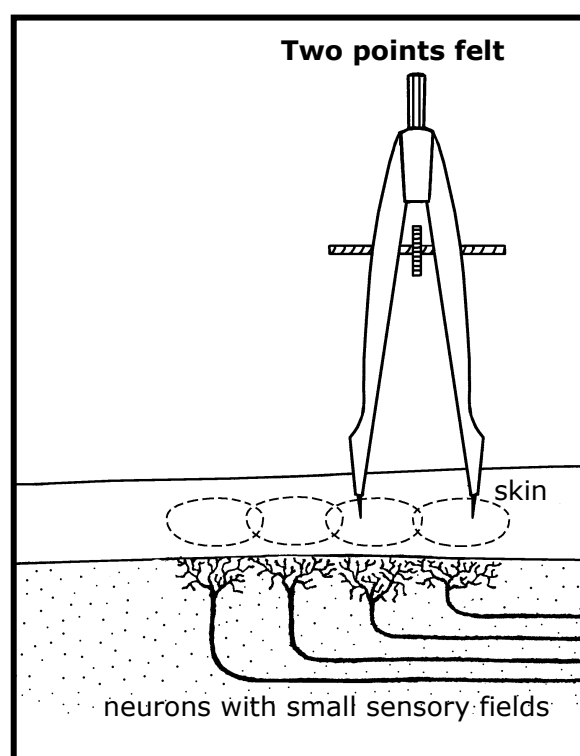
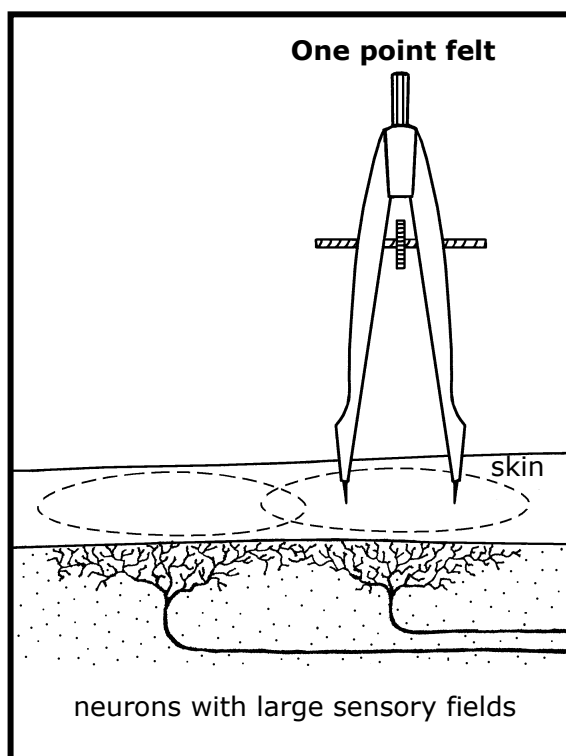
How large an area does a sensory neuron cover? You can experiment to find out:

Ask your friend not to look while you gently prick her with a pair of dividers. Ask her whether she felt two pricks or one. If the dividers are too close together, she may only feel one prick although she is being pricked in two places at once! Try it and find out how far apart the dividers need to be in order to be felt as two pricks.

Fill in the Table and analyse the results.

Table:

Body region	Minimum distance that can be distinguished (mm)
Upper arm	
Palm of hand	
Fore finger	
Thumb	
Big toe	
Sole of foot	
Calf	
Back	



1. Do you get different results if you try the same thing twice? Explain. _____

2. Do different students get different results? Explain. _____

3. In which region of the body do you think the skin has the **least** number of sensory neurons / area?

4. In which region of the body do you think the skin has the **greatest** number of sensory neurons / area?

5. What difference does it make if your friend has her eyes open or closed when you prick her skin? Explain.

6. Can you think of any other factors besides the size of the neural field that may have affected the results you got?
