MODULE 1

THE RESPIRATORY SYSTEM

DIY Lung Model

In this hands-on activity, you'll construct a working model that clearly demonstrates how your lungs inflate and deflate, showing you exactly how you breathe. It's an awesome way to see the mechanics of respiration and understand the importance of healthy lungs!

Supplies

- **Empty plastic bottle**
- **2 balloons**
- **Rubber band**
- **Scissors (for cutting)**

Instructions

1. First, you'll need an empty plastic bottle. **Ask an adult** to carefully help you cut off the bottom of the bottle. This will be the main part of your lung model.

2. Take one balloon and cut off just the very top (the narrow neck part). Now, stretch this cut balloon over the bottom opening of your plastic bottle. This balloon will act like your diaphragm, the muscle that helps you breathe!

3. Take another balloon and turn it inside out. Carefully attach the open end of this balloon to the cut top of your plastic bottle. Make sure it's secure by wrapping a rubber band tightly around it. This balloon inside the bottle is your "lung"!

4 Now comes the fun part! Gently pull down on the diaphragm balloon at the bottom of the bottle, and then let it go.

Watch what happens to the balloon inside the bottle – it should inflate (get bigger) and deflate (get smaller), just like your real lung when you breathe!

Nurse Jill's Tips

Teach others how important healthy lungs are and how things like smoking can damage tiny alveoli, making it harder for lungs to move.

Dr. Robin's Educational Section

How Your Lung Model Works

Your lung model shows how our real lungs work using negative pressure to pull air in for each breath!

1. **The Ribcage (the bottle)**
   The bottle represents your ribcage. Imagine if you were using a plastic bag instead of a bottle. Nothing would work! Your ribs keep a stable space so everything else can work.

2. **The Diaphragm ((the bottom balloon)**
   The diaphram is a flexible muscle at the floor of your chest cavity.
   - The Action: When you pull the "floor" down, you aren't just moving a balloon—you are creating more space inside the bottle.
   - The Result: Because there is suddenly more room and the same amount of air, that air becomes "stretched thin" (negative pressure).

3. **The Alveoli (the inside balloon)**
   The air from outside the bottle rushes down the opening to fill that new room.
   - The Inflation: This fills your alveoli (the tiny air sacs in the lungs).
   - The Exchange: Once they are full of air, the oxygen can move from the alveoli into the blood..

Lungs In Situ

How Do You Get Air Into Your Lungs?

Lungs are not just two big balloons and they can't breathe on their own. They are more like two wet sponges that are pulled open by the diaphragm to suck in the air.

Our diaphragm pulls down on the bottom of the lungs, pulling in air from our nose or mouth. For this to work, we have to have several things:

1. We need our ribs to keep an open chest cavity. If we were floppy, everything would get pulled down by the diaphragm including our skin!
2. We need to have an opening that's always open for air to come into. That's why we can't close our nose the way we do our mouth. And our trachea has rings around it to hold open.
3. The diaphragm is a special kind of muscle that can keep going without rest for your whole life!
4. Your brain controls it automatically--you don't have to remember to breathe when you're asleep or focused on learning.

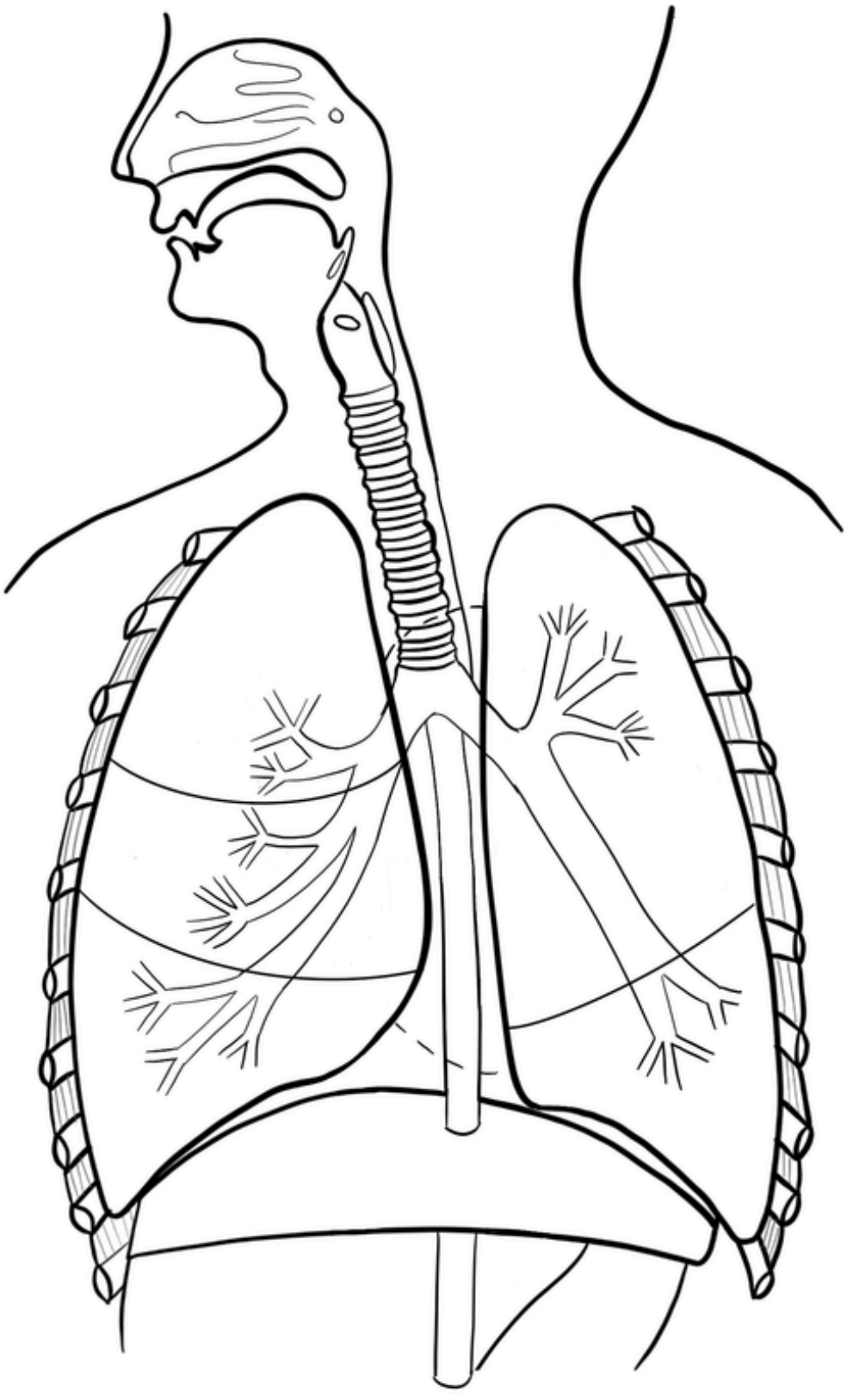
Lobes and Fissures

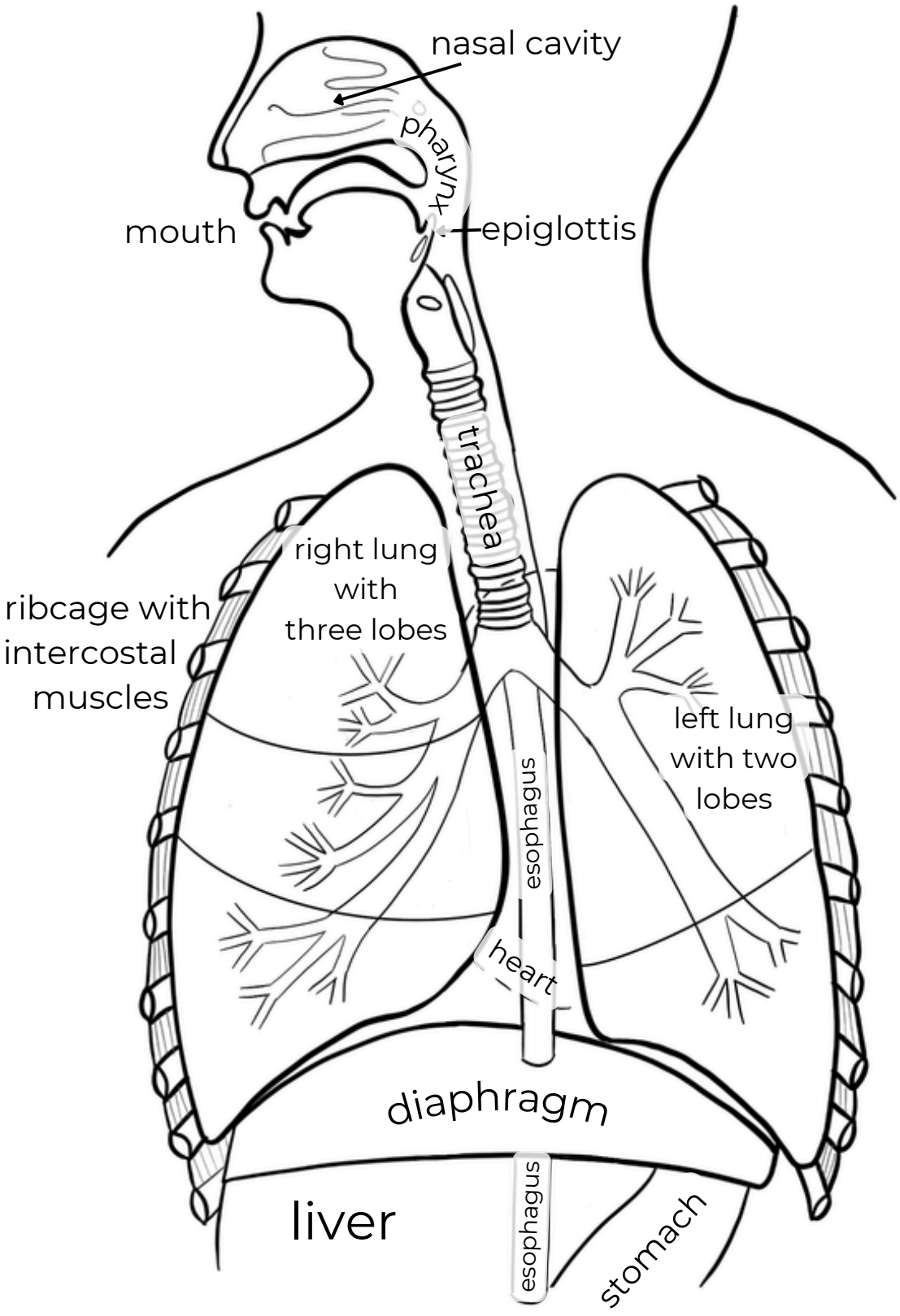
Your lungs are each divided up into lobes. The right lung has three lobes and the left lung only has two.

Can you think why there isn't enough space to have a third lobe on the left side? Because the heart is taking up that space!

The lobes are divided up by deep cracks called fissures. Our airways divide up to go into each lobe. Because the lobes are separate, bacterial infections will typically spread in just one lobe at a time.

So you might hear a doctor talk about a “right middle lobe pneumonia.” A common trick to play on medical students is to ask them to find the left middle lobe pneumonia. Why is this so tricky?





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