Heat Fixes

Overview If you tried looking at animal cells already, you know that they wiggle and squirm all over the place. And if you tried looking when using the staining technique, you know it only makes things *worse.* The heat fix technique is the one you want to use to nail your specimen to the slide and also stain it to bring out the cell structure and nuclei. This is the way scientists can look at things like bacteria.

What to Learn Heat fixes are used when the specimens move all over the place when stained, like yeast. By drying out the specimen and fixing it to the slide, you can easily stain it several times to bring out the contrast and view the structure.

Materials

- microscope
- slides
- cover slips
- eyedropper
- toothpicks or tweezers
- candle and matches (with adult help)
- stain (you can use regular iodine or Lugol's Stain)
- sugar
- yeast
- container to mix your specimen in

Experiment

1. Fill your container with warm water. Add about a tablespoon of yeast (one packet is enough) along with a teaspoon of sugar. The warm water activates the yeast and the sugar feeds it. You should see a foam top form in about 10 minutes.
2. Using your eyedropper, grab a bit of your sample (you want the liquid, not the foam) and place a drop on a fresh slide. Spread the drop out with a toothpick. You want to smear it into a thin layer.
3. Light the candle (with adult help). Heat the slide in the flame by gently waving it back and forth. Don't stop it in the flame, or you'll get black soot on the underside of the slide and possibly crack it because the glass heats up and expands too fast. You also don't want to cook the yeast, as it will destroy what you want to look at. Just wave it around to evaporate the water.
4. Add a drop of iodine (or stain) to the slide. Wait 15 seconds.
5. Rinse it under water. (You can optionally stain it again if you find it's particularly difficult to see your specimen, but make sure to look at it first before repeat staining.)
6. Place a drop of water (use a clean eyedropper) on the specimen and add the cover slip.
7. Lower the stage to the lowest setting and rotate the nose piece to the lowest magnification power.
8. Place the slide on the stage in your clips.
9. Focus by looking through the eyepiece and slowly turning the coarse adjustment knob. When you're close to focus, switch to the fine adjustment knob until it pops into sharp view.
10. Adjust the light level to get the greatest contrast so you can see it better.

11. Move the slide around (this is where a mechanical stage is wonderful to have) until you spot something interesting. Place it in the center of your field of view, and switch magnification power to find a great view (not too close, not too far away). Adjust your focus as needed.
12. Sketch what you see (don't forget the title and magnification power!) using the *Microscope Data Sheet.*
13. NOTE: What other things can you look at? You can scrape the inside of your cheek with a toothpick and smear it on a fresh slide, take a mold sample from last week's leftovers in the fridge, or…? Have fun!

Reading

Heat fixes are used when the specimens move all over the place when stained, like yeast. By drying out the specimen and fixing it to the slide, you can easily stain it several times to bring out the contrast and view the structure. This is a very good technique for viewing bacteria.

When you want to keep your specimens for a longer time, like a couple of months, simply apply a drop of superglue to the top of the slide before adding the coverslip. Press gently with a toothpick (not your fingers!) to squish out any bubbles.

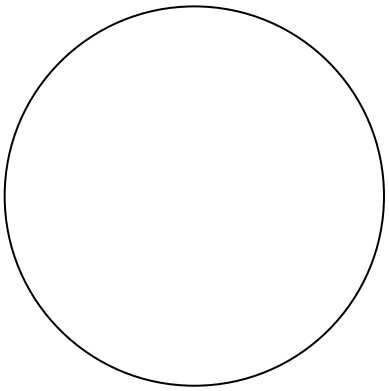
Exercises

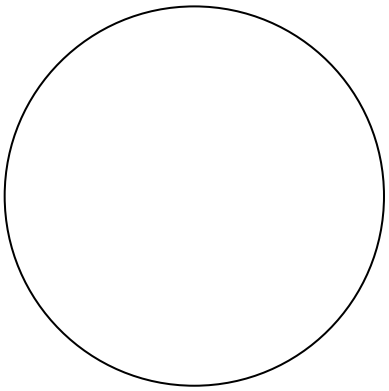
1. Why do we use heat fixes?

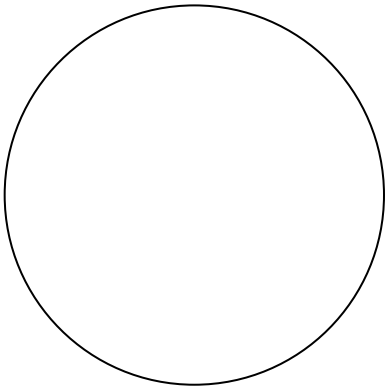
2. Briefly describe how to do a heat fix.

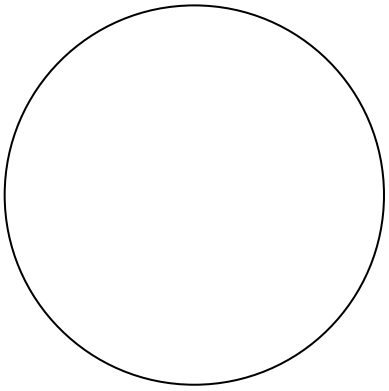
3. What is a specimen that needs a heat fix?

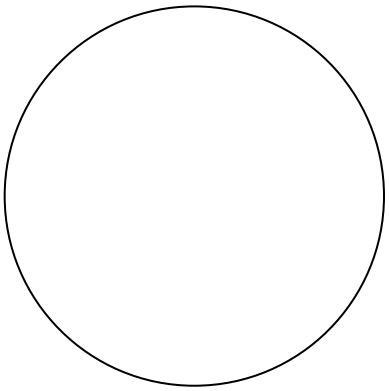
Heat Fix Microscope Data Table

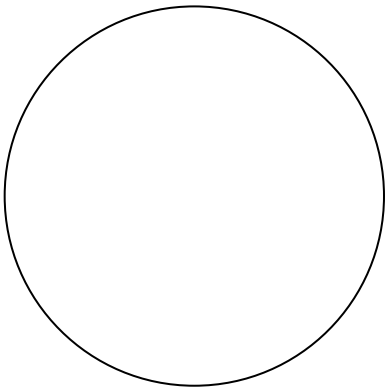












Answers to Exercises: Heat Fixes

1. Why do we use heat fixes? (To observe specimens that wiggle and squirm.)
2. Briefly describe how to do a heat fix. (Put a drop of the specimen on a slide and spread it thin with a toothpick. Light a candle and wave it back and forth underneath the slide, to evaporate the water. Add a drop of iodine, wait 15 seconds, then rinse. Place a drop of water on it, then place the cover slip on it.)
3. What is a specimen that needs a heat fix? (Animal cells.)