Burst Speed Trials Protocol

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**Setup**

*Lights*

* Turn off the overhead light in the room
* Turn on the power strips connected to the top light arrays.
  + The power strip on the left is hard to reach. Try not to get your arm stuck, or jostle the plastic housing, or turn the temperature knobs on the faucet.
* Turn on the LED arrays. They are controlled by small white switches inside the plastic booths.
  + Note: even if you’re only using one tray, turn on all of the lights, for consistency.
* Check for glare on the surface of the water in the trays (see *Trays*). If the glare is from the LED strips, move the trays. If the glare is from the overhead lights, you may need to re-cover the gaps in the plastic booths with pieces of corrugated plastic.

*Water*

* Turn the central silver handle (**not** the blue and red temperature handles!) to flow water through the system. Flow should be moderate to light.
  + If the water flow is too strong, it will float the trays/push them around.
  + Once the entire metal surface is flooded, turn the flow down to just maintain the water level.
* Monitor the temperature of the water using the multimeter attached to the righthand booth. You want **16.7ºC, plus or minus 1ºC.** Adjust the temperature knobs if necessary.
  + Do **not** adjust the cold knob.
  + Adjust only the hot knob. It is extremely sensitive. Sometimes moving it so slightly you can barely tell that it moved will raise the temperature by more than a degree.
* Be careful not to let electrical cords touch the water.

*Cameras and iPads*

* The cameras should fit snugly in their plastic slots on top of the booths, lenses toward the front.
* The camera on the left is **SkellyGoPro1, password 1RASY2019**. It is labeled with pink tape.
* The camera on the right is **SkellyGoPro2, password 2RASY2019**. It is labeled with teal tape.
* The corresponding iPads are labeled with the same tape colors. One iPad is used for each camera.
* To connect the cameras to the app:
  + Turn on cameras by pressing and holding the power button on the front.
  + Turn on wifi by pressing and holding the setup button on the side.
  + On each iPad, open the GoPro app. Follow instructions to connect to the cameras. You may need to enter the password for the camera, but more likely you will be prompted to go to the iPad’s wifi settings and choose the camera’s wifi network. Choose SkellyGoPro1 and SkellyGoPro2 for the respective iPads.
  + Go back to the app, and a preview of the camera view should show up. If it doesn’t, you may need to close and reopen the app, or click around until it refreshes.
* The app will show you what the camera is seeing. You can also use it to check that your settings are correct, and to check the battery life.
  + **1080 p**
  + **60 fps**
  + **Narrow fov**
* When the camera is low on battery, the battery icon will flash. Replace the batteries as needed. You will need to reconnect the camera to the app after each battery change (ew, I know).

*Trays*

* Tray 1 (marked with 1 piece of red tape) goes on the left. Tray 2 (2 pieces of tape) goes on the right.
* Make sure the trays are reasonably straight by looking at the camera view on the iPad and adjusting the tray placement. Doesn’t have to be perfect.
* Make sure trays are not floating.
* If there is any glare from the LED’s on the water surface in the trays, slide the tray over so the glare goes away.
* Empty old water from the trays into the metal trough. Fill each tray with tadpole water from the animal room, until **water is halfway between the bottom of the tray and the line below the rim.**

*Label*

* Make sure the label doesn’t cover the camera’s view of the tray bottom (check on the iPad to see what the camera sees).

*Data sheet*

* Make sure you have a data sheet and pen handy on a clip board.

**Procedure**

1. Set up as described above.
2. Check the document to see which tadpole is up next. Go find it in the incubator.
3. Using another jar and a pee cup, decant the tadpole into the pee cup. Try to get as little food/poop as possible in the pee cup. Use the turkey baster if necessary. The goal is to not get too much food into the tray, and to keep the original water/food/poop in the tadpole’s jar when it goes back into the incubator.
4. Gently pour the tadpole into the tray. Place a cylinder over it (careful of the tail!) and move it to the center of the tray.
5. Write the tadpole’s ID on the **label** using a whiteboard marker.
6. When the label is written and the tadpole is in the tray, **start the video**.
7. Start a timer for **1 minute**. Allow the tadpole to rest in the cylinder.
8. During the 1 minute, fill out the relevant entries in the data sheet. Check the temperature probe to get a reading for the initial temperature.
9. Towards the end of the 1 minute, place your hand on the cylinder in preparation to lift it up.
10. If the tadpole starts moving in **the last 15 seconds of the 1 minute**, restart the count to 15 from when it stays still.
11. When the tadpole is still and the timer has finished, gently lift up the cylinder.
    1. Best to lift one side first, to break the surface tension a bit at a time. I tip up the back side first, keeping the cylinder in front of the tadpole’s face until the end. Allow the surface tension to break. Then very slowly and gently lift the rest of the cylinder.
12. If the tadpole bolts, recapture it, move it to the center, count **30 seconds**, and repeat step 11.
13. If the tadpole doesn’t bolt but starts wiggling within the cylinder, put the cylinder back and restart the count for **15 seconds**. Then repeat step 11.
14. If you successfully lift off the cylinder without startling the tadpole, remove your hand and the cylinder completely from the camera’s field of view.
15. Using the white probe, reach in and tap the end of the tadpole’s tail. Don’t put your hand/sleeve/etc. into the camera’s fov.
16. Immediately recapture the tadpole in the cylinder, move it to the center, and count **15 seconds** before lifting the cylinder for the next burst. The 15 second count should restart if the tadpole wiggles: it needs to be still, resting, for 15 seconds.
17. If the tadpole bolts while you’re recapturing it, move it to the center and count **30 seconds**. If the tadpole wiggles during the second 15 seconds, restart the 15 second count once it is still.
18. Do two more bursts, for a total of **3 probed bursts per tadpole**.
19. If, during a burst, a tadpole swims underneath the probe before you have moved it out of the way, or if you think it might have done so, do an additional burst (waiting the appropriate amounts of time).
20. If the tadpole gives a particularly wimpy burst, do another burst just in case (with waiting periods).
21. When you have collected all the bursts, **stop the video**.
22. Remove the tadpole from the tray and put it back into its jar. Take a **final temperature reading** and record it. Finish filling out the data sheet if necessary.
23. Erase the label and put the tadpole back in the incubator. Go get the next tadpole.

**Data**

* Import the GoPro videos and put them in a folder with the date, inside Data:E > Kaija > BurstSpeed2019.
  + Each date folder has subfolders for cameras 1 and 2.
* Rename the videos with the tadpole ID (written on the label in the video)
* Enter the data from the data sheet.
* Plug in the backup disk (labeled with red tape, on Kaija’s desk) and copy the new data over.
* ***Once all the data (videos etc.) are backed up***, delete the videos from the GoPro cameras.