**Do finger wrinkles have a function?**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_\_\_\_\_

In each of the spaces below, sketch a few wrinkly fingers, then describe any patterns you observe:

|  |  |  |  |
| --- | --- | --- | --- |
| **Example:** |  |  |  |
|  |  |  |  |

**Observe Structure**: What patterns do you notice in the shapes and sizes of finger wrinkles in your class? What direction do finger wrinkles seem to point? Are they all the same width? Are they thinner in some places?

**Predict**: What could be a possible function of finger wrinkles? What about their structure makes you think they serve that function? Are there similar structures on other animals or objects that might give you some hints?

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**Watch**: **“Getting a Grip on Finger Wrinkles”** by Science Friday

Based on the video, answer the following questions:

1. True or False? Finger wrinkling is caused by swelling when the fingers absorb water: T F
2. When you immerse your hands into hot water, your blood vessels \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. One hypothesis is that finger wrinkles are like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on cars
4. Smulders published a paper that showed that people with wrinkly fingers can move wet objects from one bin to another \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than people without wrinkly fingers

**Question**: Do finger wrinkles improve grip on wet objects?

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**Hypothesis:**

*Justify your prediction*

**Data Collection:**

In the table below, record the length of each “slip” of the cup when weight is suddenly added. Longer slips mean worse grips!

*Use centimeters (cm) as your unit of measure.*

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| --- | --- | --- | --- | --- | --- |
|  | Subject #1: | Subject #2: | Subject #3: | Subject #4: | Average (S1+S2+S3+S4)  4 |
| Smooth fingers |  |  |  |  |  |
| Wrinkled fingers |  |  |  |  |  |
| Which had better grip,  Smooth or Wrinkled? |  |  |  |  |  |

**Results summary**: How many of the test subjects were faster at moving wet objects when their fingers were wrinkly? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

On average, were the test subjects faster at moving objects when their fingers were smooth or wrinkly? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

On average, HOW much fast were the test subjects at moving wet objects if their fingers were wrinkly? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Are fingers better at gripping wet objects when they are wrinkly or smooth? Do your results agree with the results of previous researchers?

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**Graph your results**: For each subject draw a bar graph to show how far the cup slipped. Use one color to draw the bars for wrinkled fingers, and one color to draw the bars for smooth fingers. Use the checklist below to make sure you have added all the information you need to your graph:

* All test subject data are graphed
* Wrinkled and Smooth results can be told apart
* A ruler was used to make straight lines
* Graph Title
* Color Key
* X-axis labels
* Y-axis labels

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**Finger Wrinkling Conclusions:**

1. Based on your experimental results, do you agree with the hypothesis that finger wrinkles could function to improve grip on wet objects? Why or why not?

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2. How did you measure gripping function? How could you tell the difference between a good grip and a slippery one?

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4. *Synthesis:* A company wants to start making plastic dish gloves for washing glass dishes without getting your hands soapy. Give them some advice for how to design the structure of these gloves so that when people use them, they are less likely to drop and break their glass dishes while rinsing them. Use your findings from this lab and the video to justify your suggestion

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