

HOW TO PREVENT THE ERASER FROM BREKING

2-2 16group S, Takahashi Y, Tamura

~Abstract~

We are fed up with breaking erasers, so we want to find how to prevent erasers from breaking. Erasers were moved with them changed of the angle and distance, power. As a result, the factor the erasers break easily is mainly power.

~Introduction~

1 Hypothesis

Erasers break easiest at an angle of 90 degrees to the desk. Also, the larger power which affect erasers, the more easily them break. It is because, an eraser is under a heavy load.

2 Method/Research

There were a cardboard on the scale to be arranged power which affect an eraser does 300 round trips.

① Inspection of angles

Angles between a cardboard and an eraser were set three-stage. (30 degrees, 60 degrees, 90 degrees)

※Distance which erasers move (10cm)

Power (+1.0kg)

Speed (20cm/s)

were arranged.

② Inspection of speed

Speed of moving erases were set three-stage. (20cm/s, 40cm/s, 60cm/s)

※Distance which erasers move (10cm)

Power (+1.0kg)

Angle (30 degrees)

were arranged.

③ Inspection of power

Power of affecting erasers were set three-stage. (+1.0kg, +2.0kg, +3.0kg)

※Distance which erasers move (10cm)

Angle (30 degrees)

Speed (20cm/s)

were arranged.

~Result~

Cracked→△, broke→○, not changed→×

Angle	1st	2nd	3rd	4th	5th
30degrees	△	×	×	×	×
60degrees	△	×	×	×	△
90degrees	○	×	×	×	×

Speed	1st	2nd	3rd	4th	5th
1/1s	△	×	×	×	×
2/1s	×	×	×	△	×
3/1s	×	×	×	×	×

Power	1st	2nd	3rd	4th	5th
`+1.0kg	△	×	×	×	×
`+2.0kg	△	△	○	△	○
`+3.0kg	△	×	○	△	○

~Conclusion~

• It is easily to break erasers had no relationship between angles and speed.

• Affected smaller power, erasers do not break.

• It is easy to break for erasers is changed by a combination of each condition.

Prevent skirts from rolling up

2-2 group17 Miki Saito Wakako Takakusagi

Abstract

The experiment that focus on the length of the steps and the length of the rucksack string was conducted because skirts make me worry about rolling up in the daily lives.
The experimental result showed that the length of the rucksack string affects.

1. Introduction

(1) Background

High school girls worried about skirts rolling up in the daily lives.

(2) Hypothesis

1. The shorter the rucksack string, the harder it is for skirts to roll up.
2. The shorter the length of the steps, the harder it is for skirts roll up.

2. Methods/Research

<Precondition>

1. The rucksack weight is eight kilograms.
2. Inspection time is five minutes.
3. Used rucksack are two kinds of it.

<Hypothesis1 >

1. The length of rucksack string was tested at 0,10,20,30 centimeters.
2. At a tempo of 102.

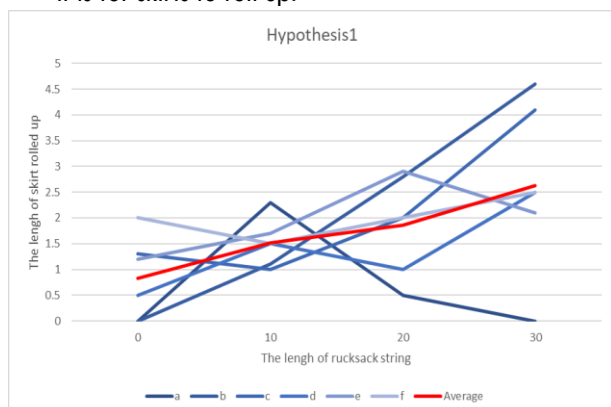
<Hypothesis2>

1. The length of rucksack string was standardized at 17 centimeters.
2. At tempos of 102 and 153.

3. Result

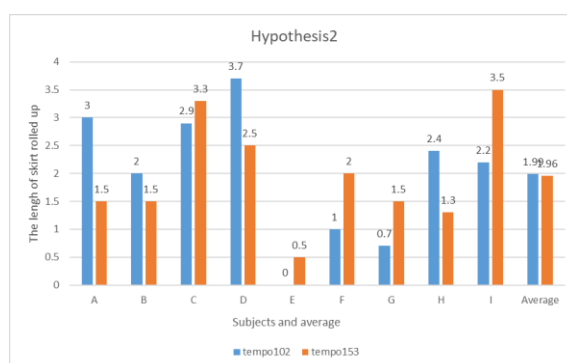
<Hypothesis1 >

On average, the shorter the rucksack string the harder it is for skirts to roll up.



<Hypothesis2>

The length of the steps made little influence on the result.



4. Discussion

The result that the shorter the rucksack string, the harder it is for skirts to roll up showed a relationship between skirts rolling up and the position of the bottom of the rucksack.

5. Reference

広島大学総合科学部保健体育講座 山崎 昌廣
九州芸術工科大学人間工学教室 佐藤 陽彦

「総説 ヒトの歩行－歩幅，歩調，速度およびエネルギー代謝の観点から－」

(www.jstage.jst.go.jp)

Cause of the skirt rolling up due to the backpack

2-2 Nakamura Mina Machida Chihiro

Abstract People with skirts rolled up are often seen when carrying a backpack. Therefore we investigated the conditions under which the skirts were difficult to roll up even when carrying a backpack, and considered the reason.

Introduction i) Background High school girls often have their skirts rolled up when they are carrying their backpacks.

ii) Purpose To clarify the reason why the skirt rolls up and think about countermeasures.

iii) Hypothesis a) The larger the area where the skirt and the backpack touch, the easier it is for the skirt to roll up.

b) The heavier the backpack, the easier it is for the skirt to roll up.

Methods/Research i) Equipment used

Backpack, PET bottles, Water, Major, Hemp string, Vinyl tape, Metronome.

ii) Experimental method All the experiments were unified some conditions :backpack, the speed of walking, the time of walking, a steady stride.

① The backpack's string was changed for the survey.
Change the length of the backpack on the skirt to 15cm, 20cm and 25cm. And unify the weight of the PET bottles to 6kg.

② The backpack's weight was changed for the survey.
Change the weight of the PET bottles to 4kg, 6kg and 8kg. And unify the length of the backpack on the skirt to 20cm.

Result

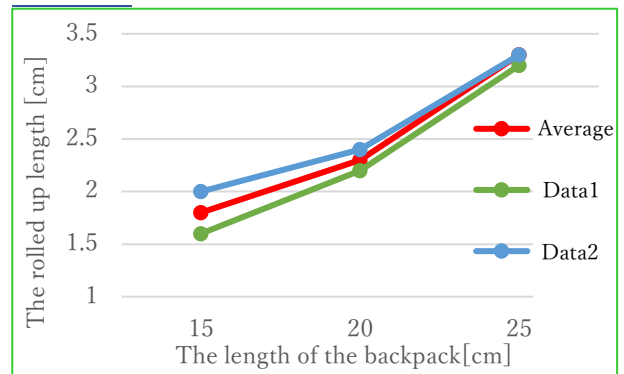


Figure1 Relationship between the length of the backpack and the rolled up length.

The longer length of the backpack, the longer the length of the rolled up skirt.

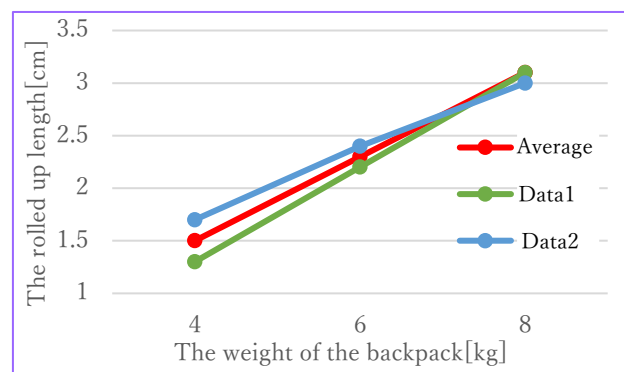


Figure2 Relationship between the weight of the backpack and the rolled up length.

The heavier the backpack, the longer the length of the rolled up skirt.

Discussion

It is important that the backpack is short and the weight of the backpack is light so that the skirt does not roll up. Since the rolled up length changes even if the stride length and walking speed are the same, it can be said that the rolled up length may change depending on the walking posture. Of the area where the backpack touches the back, the area that touches the skirt is large and the greater the force applied from the backpack to the back, the easier it may be for the backpack to roll up.

Alarm that don't go back to sleep

2-3 Group 1 Inada Karen Sakurai Yurika Koido Miko

Abstract

Sleep is important for people's lives. But some people find it difficult to get up in the morning. Will the alarms we use on a regular basis wake up properly? It can be described that somebody's sounds tempt us into deep sleeping. However, we cannot wake up at the time one wants to wake up. To address these problems, we developed alarm sounds whose pitch and volume are changed. And evaluated difference of the time.

1. Introduction

(1) Purpose

To get up firmly based on the alarm sound of the iPhone.

(2) Hypothesis

- (i) Unprocessed height makes it easy to wake up.
- (ii) The louder the sound is, the easier it is to wake up.

2. Method/Research

- ① Examine the pitch of the sound used as a deformation.
- ② Process the deformed alarm sound with the frequency in the table of provisional 1 to make the alarm sound of three heights.
- ③ Ask 6 randomly selected people to actually use the sound and answer the questionnaire.

3. Result

- ① Deformation 2692Hz ② High 5405Hz low 1357Hz
- ③ Please show that two figures.

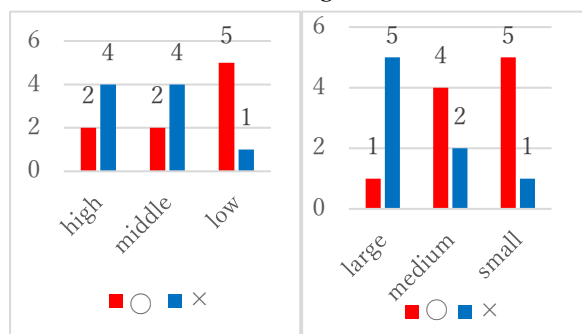


Figure 1. Change the height Figure 2. Change the loudness

Figure 1 shows whether or not you slept twice by changing the sound. The number of people who slept

twice in the high and deformed sounds was small, while the number of people who slept twice in the low sound was overwhelmingly larger than the others.

Therefore, it can be said that the low sound is easier to sleep twice than the other two.

In addition, figure 2 shows that loud sounds clearly do not sleep twice, and quiet sounds tend to sleep twice.

Next, look at Table 3. This shows the average of the difference between the time when the alarm was given and the time when it actually happened, divided into the athletic club and the cultural club.

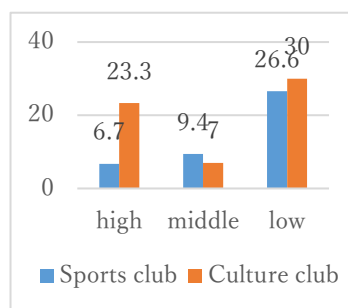


Figure 3. Average time difference

In both cases, there is a big difference in the low sound, and it can be said that it is unlikely to occur. However, there is a big difference in the high-pitched sound in the culture club.

From the above, it is presumed that medium alarms and loud alarms are likely to wake up.

4. Consideration

In all experiments, low-pitched alarms were found to be difficult to wake up. This is probably because the stimulation to the brain is small. Also, comparing the Culture Department and the Athletic Department, the difference between the time when the Culture Department wakes up and the time when they want to wake up is larger. Therefore, it was found that there is no correlation between the alarm sound and fatigue.

Creating an alarm sound that always occur within an error of 10 minutes.

2-3 (2) Ayaka Shiobara /Chika Sugiyama/ Nanami Yamori

Abstract

Can you get up early without your family's voice?

Can you get up within 10 minutes actually?

Maybe many people are not good at getting up early but someday we have to wake up by ourselves.

So we researched the best sound to awake.

The provisional verification

Use ; 6 alarm sounds with changes in **tempo** , **height** , on the iPhone.

How to ; the time you want to wake up , you wake up , and the ease of waking up with the cooperation of 6 people.

Result ; "chime" and "opening" have small difference between the time a person wants to wake up and the time when a person waked up.



Find the similarities and differences between the 2 sounds mentioned above.

Similarities; there is a large differences between the highest and the lowest points of hertz (height)

Differences; "opening"has a constant tempo of 160 , while the "chime" voice is flowing irregularly.

Main verification

Creating an alarm sound that always occur within an error of 10 minutes.

Use ; based on the provisional verification.

① All(marimba, bell , metal)sounds and regular tempo(160)
② All sounds and irregular

③ Marimba sound and irregular
④ Marimba sound and regular
⑤ Bell sound and regular
⑥ Metal sound and regular
⑦ Metal sound and irregular

How to ; With the cooperation with 8 people with the 7 sounds, in a week as well as the provisional verification ; Time you want to wake up , wake up , ease of waking up (5 grades)

Result ; following the graph.

(best result →red worst result →green)

number	average	average evaluation
①	11.8	4
②	16	3.8
③	23.6	3
④	7	3.5
⑤	41.4	3.4
⑥	27.3	3.1
⑦	11.8	3.4

Conclusion

The average evaluation is higher for regularly flowing one.

There might be a causal relationship between the ease of waking up and the relationship of being awakened.

There are individual differences in the ease of waking up. (Health status, sleep time, etc.)

References

『朝の目覚めに効果的なアラーム音は？』

www.francebed.co.jp

『目覚ましに最適な iPhone のアラーム音』

www.standby-media.jp

『目覚めの良いスマホのアラーム音とは？』

www.itmedia.co.jp

Growing plants with less effort!

- *Efficient soil using polymers* -

2 - 4 Mizuki Aihara Suzu Imaizumi Kurumi Higuchi

1. Abstract

We studied the conditions under which plants can be cultivated with less effort, focusing on moisture and nourishing. We studied optimum structure by using highly absorbent polymers and soil. As a result, it was found that the polymer placed in the upper layer + medium layer was most desirable because it has the most nutrients in the soil.

2. Introduction

We have been interested in desert greening for a long time. Upon closer inspection, we found that the desert uses highly absorbent polymers. According to the reference, the yield increased by about 1.5 times when the polymer was in the soil. There are several possible uses of polymers, so we decided to find out if it's really best to mix them.

3. Methods

(equipment)

1L beaker × 4 • highly absorbent polymers • vermiculite •

plant nutrition • nutrient measuring instrument

• electronic balance

(procedure)

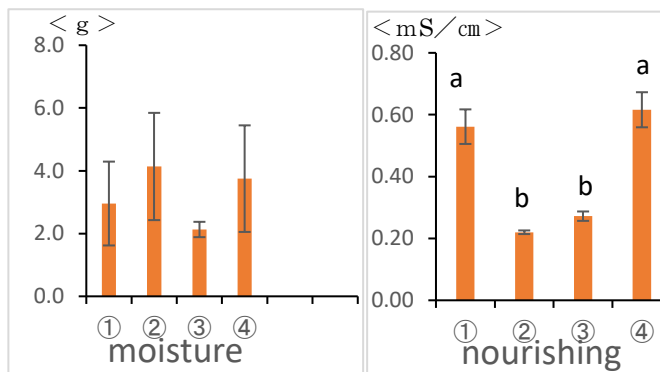
32g of polymer was placed in the beaker in 140g of soil in the ① upper layer, ② medium layer, ③ lower layer, ④ upper + medium layer, and left for a week to examine the state of nutrition and moisture penetration into the soil. The change in the amount of water was measured by checking the weight of the soil, and the change in the nourishing content was measured by mixing water with the soil and measuring it with a nourishing measuring instrument. (※ The upper and lower polymers were spread uniformly, and the polymers inside were divided into multiple and made into dumplings.)



4. Hypothesis

Since the polymer does not touch the outside air, the amount of evaporation is small and the lower layer (type ④) subjected to the gravity of the soil on its top must have the best condition in moisture and nutrient penetration.

5. Results • Discussion



<About moisture>

This time, the error range was large, and there was no significant difference between each group. According to the reference, the difference seems to be clear when the experiment is done such a long period as plants actually grow, so it is thought that the reason for the difference was that the experimental period was as short as one week. In addition, since the measured moisture content value was small, it is possible that the weight of the soil that could not be completely removed from the polymer has a large influence. So it may be due to experimental methods.

<About nourishing>

The nourishing experiment obtained the result with little standard error, which was different from moisture. Upper layer (type ①) and upper + medium layer (type ④) were significantly better results. There was no significant difference between them, but since the average value is high, we choose upper + medium layer (type ④). It can be theoretically proved from the point that there is a lot of contact area with the soil.

6. Future outlook

This time, we obtained the results on nourishing, but there were deficiencies in the experiment on moisture, and we did not get the correct result. So we would like to modify the method of experimentation on moisture next time.

7. Reference

https://www.jstage.jst.go.jp/article/jjfs/100/6/100_229/pdf/-char/ja

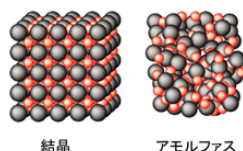
日本家政学会誌 vol.40 No.8 721~724 (1989)

HOW TO MAKE PRINCE RUPERT'S DROP

2 - 4 - 3 Kamei Haruka · Kasai Yuki · Yamada Hiromu

ABSTRACT

We tried various ways to make *PRINCE RUPERT'S DROP*, but it all failed. So we decided to research nature of glass to find out the cause of the experiment.



1 INTRODUCTION

(1) Purpose

- ① To reproduce PRINCE RUPERT'S DROP with a high probability.
- ② To find out if we can reproduce the modern glass.

(2) Hypothesis

If it's an amorphous, then you can recreate it.

2 RESEARCH

Change things are the proportion of water and glycerin, water temperatures.

- ① Measure the weight and the temperature of water.
- ② Add Glycerin to water at the hate of the decision.
- ③ Heat the glass stick with a hand burner and drop of ② liquid.

3 RESULT

I failed five times.

	Glycerin	Water	Total
1 st time	0g	500g	500g
2 nd time	250g	250g	500g
		Hot (60°C)	
3 rd time	0g	500g	500g
4 th time	250g	250g	500g
5 th time	500g	1500g	2000g

4 OBSERVATION

- It melted the empty glass stick and broke through the air inside.
- The water was not so high that the melted glass had broken before it chill.
- There was a lot of melted glass.
- We failed even if we changed the quantity. There is a success in a small amount of liquid. →From these two, the amount of liquid is not relevant.
- Since the temperature was low, the air around the glass didn't melt.

- A glass bar with no holes.
- Only Glycerin.
- The temperature of liquid is low.

If we have these three conditions, we'll succeed. But the fire of the glycerin is lower than the melting of glass, we need to consider the risk of fire.

5 REFERENCE

<https://www.bing.com/images/search>

NIPPONICA

How to extend the distance of the handball

Abstract

2-4 15 Hibiki Hayashi Anri Horiuchi

The handball is under-slow, and if you don't hold the ball, put on a run-up, twist your body and throw it, you can get a long distance.

1.Introduction

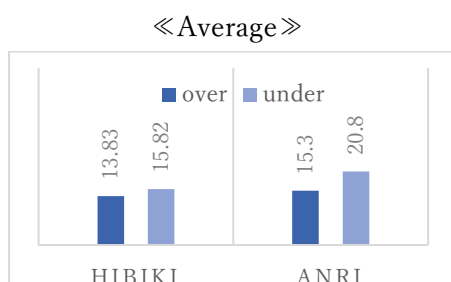
Purpose:To improve the record in the physical fitness test.

2.Tentative research

Experiment with the expectation that under-throw will fly more than over-throw(throw 15 times each for over-throw and under-throw, and compare the average distances)

It turned out that the under-throw flies better than the result.

As a consideration, it is thought that the reason why the under-throw flew more than the over-throw is because of the rotation of the body.



3.Main research

(1) Hypothesis

- ① It is good to turn your back in the throwing direction and throw.
- ② It is longer distance to throw with run-up than no run-up.
- ③ As for how to hold the ball, it is better to fly it as if you put it on the ball without grasping it.

(2) Research method

Criteria...stand at right angles to the throwing direction and throw the ball without grabbing it and throw it without a run-up.

Throw 5 times (2 people) with each method and compare the averages.

Method①

1. face the front
2. stand at right angles to the throwing direction and throw with rotating body.
3. turn your back in the throwing direction and throw.

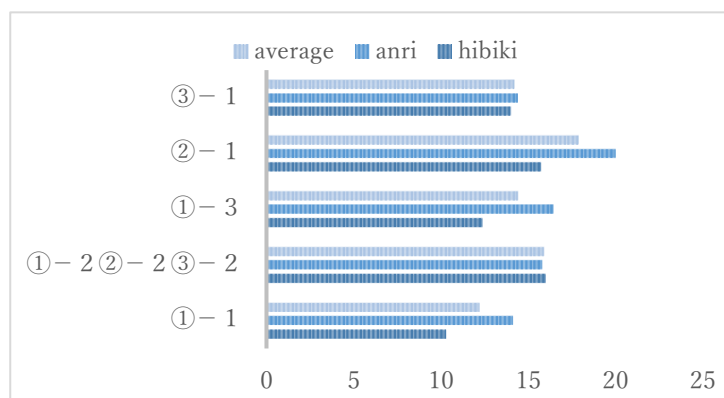
Method②

1. with run-up(2m)
2. no run-up

Method③

1. grab the ball and throw it
2. don't grab the ball, just put it in your hand

(3) Research results



4.Consideration

From the results, it was found that it is best to throw the ball with the ball in your hand with a run-up while twisting your body at a right angle from the throwing direction. From this, it is considered that the initial velocity of the ball is increased by giving momentum to the body by the force of rotation of the body and the approaching run, so that the flight distance is increased.

5.Summary

- Under-throw
- Right angle from the throwing direction
- Throw with run-up
- Throw the ball in your hand

These four conditions give the longest flight distance.

How to split one-use chopsticks in the center

2-5 Group25-2 Ino Haruka Takeuchi Kyoko

Abstract

It is difficult to split one-use chopsticks in the center. It can be described that one-use chopsticks will be split when an equal power works both sides of them. However the way which one-use chopsticks can be split in the center is not known. To address these problems, we researched which power can split one-use chopsticks in the center, and those were split in the center when one-use chopstick's one side is pulled and the other side is fixed.

1 Introduction

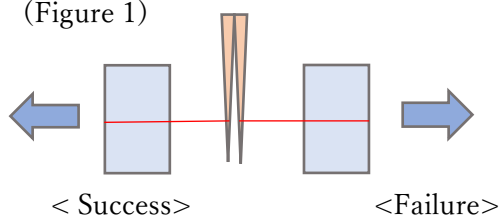
One-use chopsticks which we could not split in the center is difficult to use and make us depressed. And we sometimes feel dull pain when we use them. Therefore we decided to make a study about how to split one-use chopsticks in the center.

One-use chopsticks are split in the center when they are pulled by an equal power on both sides. It can be described that it is difficult to split it in the center because of our dominant hands. One-use chopsticks are pulled by a bigger power on right side when it is split by a person who is a right hander.

2 Methods

Thread was put on the point of 5cm from the end of a one-use chopstick. It was pulled vertically and straight. There were two kinds of ways to pull the thread. 20 one-use chopsticks were split at one pattern.

(Figure 1)



A) Pull one-use chopsticks by an equal power on both sides. Thread was pulled a constant distance on both sides , taking an equal time.

B) Pull one-use chopstick' right side by a bigger power

than its left side.

But it was difficult to take an equal time in order to split one-use chopsticks. So another experiment was add. It enable one-use chopsticks to be pulled by an equal power accurately.

C) Pull one-use chopstick's right side and fixed its left side at three points.

3 Result

	A	B	C
success	4	1	6
failure	16	19	14
success rate	20%	5%	30%

(Table 1)

C had the largest number of one-use chopsticks split in the center.

4 Discussion

The result of the experiment was that C is the best way to split one-use chopsticks in the center. This result leads to the conclusion that one-use chopsticks are split in the center when they are pulled by an equal power on both sides.

A projection angle of a ball to reach the longest distance

2-5 miyuki kenjyo, aoi kotani

Abstract

To measure correct numeric data, our own device was used. It was examined the relationship between a projection angle of a ball and distance. At first, experiments of angles of 20, 40, 60 and 80 degrees were done. However, there was the situation it was not easy to measure distance. So the survey was conducted at an angles of 35, 40, 45 and 50 degrees. In conclusion, throwing of an angle of 45 degrees made the longest distance.

Introduction

(1)purpose

There is strength decline among young people recently. Especially, that of throwing ball is severe. Therefore, the way throw a ball father should be spread.

(2)hypothesis

The angle of 45 degrees can make the longest distance in theory.

Methods

Our own device was used to measure the correct numeric data. The device was made of cardboard and a PVC pipe. A tape measure was put on the floor before experiment. One adjusted an angle and measured the flying distance , the other projected the ball.



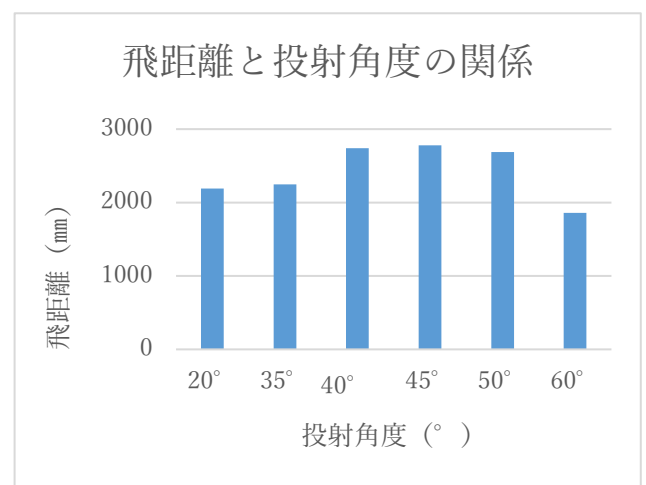
Figure1.The appearance of an experiment

Result

投射角度	飛距離
20°	2192mm
35°	2246mm
40°	2738mm
45°	2780mm
50°	2690mm
60°	1858mm

It was found from the result that a projection angle of 45 degrees made the longest distance.

Table 1 .Result



Graph 1 .Frying distance and angle of projectoin

Discussion

At a projection angle of 45 degrees, it had the longest distance. However, there was not much difference among the data. And there was variation in the same angle setting. It seems to be the effect of the difference in initial speed. Therefore, experiments focused on initial speed should also be conducted.

Reference

「ボールを遠くへ飛ばすには」(<https://gakushu.shizuoka-c.ed.jp/science/ronnbunshu/062098.pdf>)

The color that are recognized quickly.

2-5 Kana Otsuki Miyuna Shibasaki Yuina Mori

Abstract

Subjects see what are displayed on the projector and respond questions to find the color that are recognized quickly. The result of black background is different from the result of white background.

1, Introduction

When we live normally, we recognize a lot of colors. For example, road signs are red, blackboards are green, and chalks are white. Then, what is the best color to recognize to see easily? If we can know the answer, we can use effectively our notebooks, posters, and so on.

And we predicted red is the best color to recognize because red has been used to express a danger.

2. Methods/Research

Colors of target:

Red,Blue,Yellow,Orange,Pink,Light Blue,Purple,Green

R: 255 0 255 255 255 0 127 0
 G: 0 0 255 127 127 255 0 255
 B: 0 255 0 0 255 255 127 0

(Human can recognize colors in three colors: red, green, and blue, and all of the colors are made of those three colors. An RGB is a value for assigning a color, and when each color of red(R), green(G), and blue(B) is assigned by a value of 0 to 255 that the color can be determined by a combination of values.)

Two types of background (white and black) are prepared because we thought that chrome of background will have a relationship with experimental result.



	White background	Black background
Circle		
Number & Alphabet	CSy C2e 7ab PfN dFR SRZ 6zX hjp	EnT 9xR LHB 5U8 aQZ dJQ 2D8 QRt

Chart.1

The slides were displayed on the projector, and we asked them to write the color that left the most impression in the case of circles and the one that appeared the fastest in the case of number and alphabet. A dot was set in the middle to be prevent from bias a point of view.

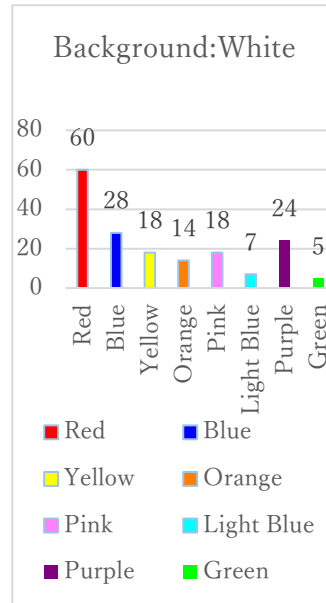
Specifically, the experiment was advanced as follows.

Countdown→Indication→Entry→Countdown→...

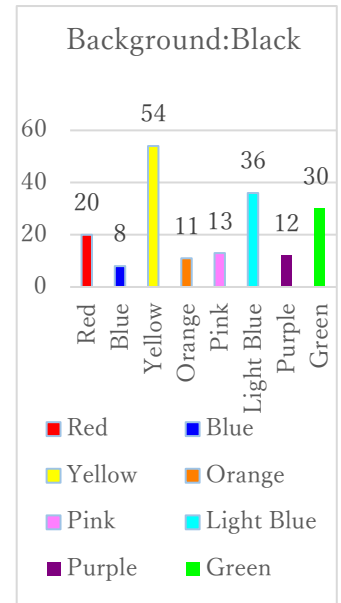
Circle: 3.0s → 0.5s → 4.0s → 3.0s →...

N&A: 3.0s → 1.0s → 4.0s → 3.0s →...

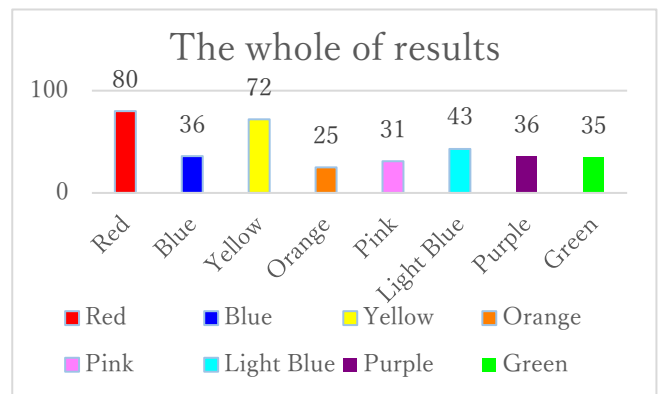
3. Result



Graph.1



Graph.2



Graph.3

4. Discussion

From the finding of research, the consideration was found that red is the best color to recognize in the case of the background is white, and yellow is the best color in the case of the background is black. But a relationship could be seen between the result of these experiments and not so much RGB as background color. So, we should use red to write notebooks, and yellow to write blackboards.

To split apart one-use chopsticks evenly right and left sides

2-5 Matsuri Ubukata, Ito Osaka

Abstract

We worked on a research to split apart one-use chopsticks evenly right and left sides.

We checked three perspectives, direction of chopsticks, holding position and whether to fix or not.

The result: sideways is better than lengthways/6cm, tip and 12cm in that order/fixation does not matter.

1. Introduction

Background: we want to have a nice meal!

Hypothesis: ① having a position 6cm from the tip

② hold chopsticks level

③ fix one hand

2. Methods/Research

• direction of chopsticks

tip, 6cm, 12cm (figure 1)

• holding position

sideways (figure 2) lengthways (figure 3)

• whether to fix or not

fixedly (figure 4) not fixedly (figure 5)

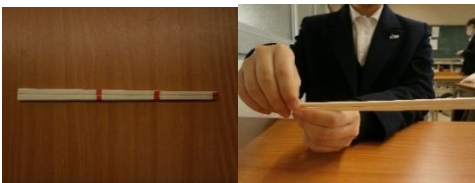


figure 1

figure 2



Figure 3

figure 4



Figure 5

The number of subjects: 2

The number of one-use chopsticks: split 10 per person in every verification

Compare the weight of left and right by electronic scales.

Compare on an average of 20.

We did not take into account the time to divide.

3. Result

The result in table 1 were obtained from experiments.

	tip	6cm	12cm
sideways fixedly	0.1155	0.1195	0.112
lengthways fixedly	0.1295	0.1375	0.1375
sideways not fixedly	0.1415	0.096	0.157
lengthways not fixed	0.1095	0.1285	0.21

 [g]

Table 1

From table 1, we arranged in descending order of results and gave marks. (12, 11, 10, ..., 2, 1)

Sideways > lengthways 41point > 37point

fixedly = not fixedly 39point = 39point

6cm > tip > 12cm 35point > 26point > 17point

The best position was 6cm, next was tip, worst was 12cm.

Sideways was better than lengthways.

Whether fixedly or not was irrelevant.

4. Discussion

direction of chopsticks and holding position was proved. But whether fixedly or not was not proved.

We thought that there were some causes.

First, there were individual differences in shape even among the same one-use chopsticks.

Second, the number of subjects was not enough.

Third, we could not judge whether equal or not by using electronic scales.

5. Reference

Superlife. @. webry. info

割り箸をキレイに左右均一に割る方法 : 古川修

HOW TO REDUCE THE PUSHING SOUND OF BALL-POINT PEN?

~To keep the volume below 50% of normal sound~

2-5 Anon Uchida, Yukina Tomaru, Atyano Motohashi

Abstract

Even if it is a trivial problem, the sound of ball-point pens prevents us from focusing on studying. So, we considered ways to reduce the sound from the perspective of pushing and components. When UV resin is used, the normal sound was measured at 50% or less. Effective method was searched based on the result of this research and the cause of the sound arising from structure of ball-point pens.

1. Introduction

(1) The background of the study

The sound of ball-point pens sometimes makes us uncomfortable during classes. (The research by cancam.jp in 2016 also found the same thing.) It might be a common thing, but the sound prevents us from focusing on things we should do. If it is solved, our life is expected to be more comfortable.

(2) Hypothesis

To reduce the sound...

- ① modify the parts of ball-point pens
- ② modify the way of push pens

2. Methods/Research

(1) measure the volume of normal sound and the room sound

(2) experimentally make parts of ball-point pen

<used materials>

- UV resin • liquid rubber • silicon
- weight saved resin clay • oyumaru



Picture1

(used materials)

(3) change the combination of parts and way of push and measure the volume

3. Result

(1) the room sound

1	43,5
2	47,6
3	43,5
4	43,5
5	43,5
average	44,32

subtract this average from measured value

(2) combination

	average	calculation
A+B	62,7	18,38
A+B'	58,2	13,88
A+B''	56,2	11,88
A'+B	56,0	11,68
A'+B'	49,5	5,18

72% down

4. Discussion

How to push: When cavity is covered by hand...

Parts: When UV resin is used...

→ the sound was reduced

(But there are some problems in functionality and differences between each cases.)

5. Reference

「仕事中に「イラッとする音」選手権、1位に輝いたのは無意識にやっているアノ音！」 (<https://cancam.jp/archives/225570>)

「タイピング音がうるさい人に教えよう！タイピング音を静かにするための3つの方法」

(<https://rikunabi-yakuzaishi.jp/article/ore/typing/>)

A way of cutting down noise of existing ballpoint pen

2-5 33-③ Chika Nakagawa Riho Hashiba

Abstract

The noise of ballpoint pen knock is sometimes noisy for us. It can be described that there are some solutions to knock the most silent, however, we do not know the solutions which is the most effective to cut down knock noise exactly.

To address this problem, we developed that the noise of ballpoint pen knock is involved in angle when we knock and in materials.

1 Introduction

(1) Purpose

We are distracted by ballpoint pen knock noise, so we do not focus on class.

(2) Hypothesis

- ① The ballpoint pen knock noise is the quietest when we knock ballpoint pen at an angle of 45 degree from plane.
- ② The ballpoint pen knock noise is the quietest when we knock ballpoint pen on the fabric of the skirt.

2 Methods

*Common subject matters

- An ordinary noise machine was placed near the ballpoint pen for measurement.
- In all experiences, 50 trials per parson and 100 trials by 2 people performed averaged.
- Check the volume when knocking in a general way.

(Figure 1)

- ① The volume at 90degree, 60degree, and 45degree were measured. (Figure 2)
- ② The volume were measured on four types of materials: a notebook, a skirt placed on a desk, a skirt worn, and an eraser. (Figure 3)



(Figure 1)



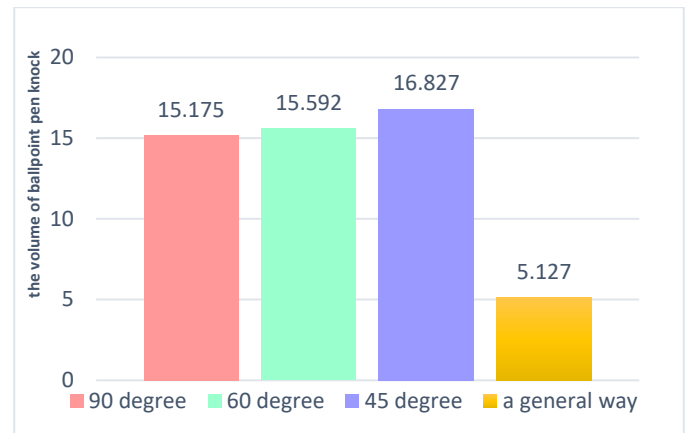
(Figure 2)



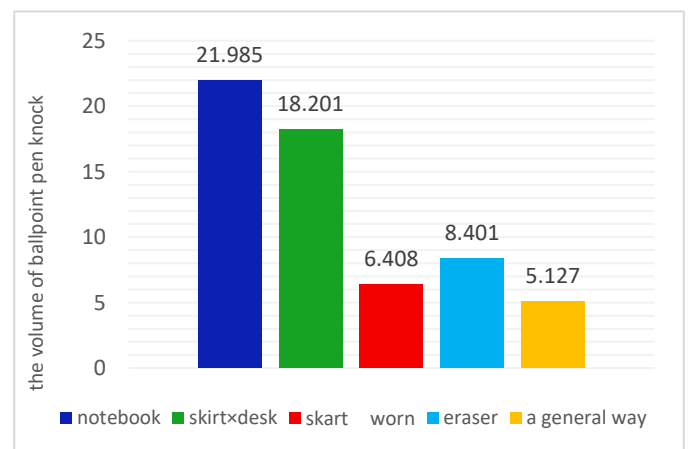
(Figure 3)

3 Result

Experiment① ↓



Experiment② ↓



4 Discussion

Since experiments ① were conducted on the desk, it is probable that the noise echoed on the desk and values increased overall. In particular, it is probable that the values increased because a larger force was applied to knock at 60degree and 45degree without slipping.

In experiment ②, the notebook and the skirt placed on the desk, it is considered that they are thickness materials, so it echoed on the desk, and the values became large. The noise on the skirt worn was the lowest of the four materials, which is thought to be due to being absorbed by the feet. (The experiment of an eraser too.)

In conclusion, the quietest way was a general way.

How to hold the chalk without breaking it

2-5 15 Isoda Kanon Araki Sayuki

1, Abstract

Most of the teachers break chawks during class. When a chalk is broken, students lose concentration and they should not waste resource. What kind of holding does not break the chalk? We find good way of holding it using forefinger firmly.

2, Introduction

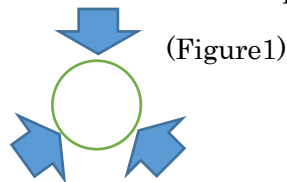
(1)Background

When we took a class, we noticed that some teachers often broke chawks, but some did not. We were interested in the difference between both sides.

(2)Hypothesis

The way to support a chalk at three points is best way. It is because the power affects a chalk equally.

(Figure1)



3, Methods

☆ We checked how much power broke the chalk in pilot study but we cannot inspect. So we focus on only how to hold the chalk without thinking the power.

(1)Ask teachers how to hold the chalk and stick stickers on their fingers.

(2) Wrap a tracing paper around the chalk and copy the position of the sticker into another chalk and make 6 of the same chawks by this way.

(3) Write “ん” from “あ” and “Z” from “A” about 1 and a half minutes in the chalk.(※1)

(4)Weigh the chalk before and after writing to check how many the chalk dwindle. (※2)

(5)Apply the vermilion ink pad to the chalk after writing to check how many the chalk remain.

※1 Make top and bottom 30cm margins to write at the level of ours eyesight.

※2 To break the chalk means that the chalk’s top is applied. That is that chalk is worn out.

5. Conclusion

Group1 is easy to break because force is applied with 1point on the blackboard and 2points on the finger. In group2, the forefinger sticks to the chalk as a whole, so it is supported and hard to break.

4. Result (unit is gram)

	①	②	③	④	⑤	⑥	Average
A	-0.46	-0.36	-0.31	-0.42	-0.61	-0.6	-0.46
B	-0.34	-0.31	-0.35	-0.62	-0.5	-0.68	-0.467
C	-0.4	-0.41	-0.38	-0.65	-0.64	-0.67	-0.525

Figure2. The difference of group1’s weight

Overall average is 0.484g.

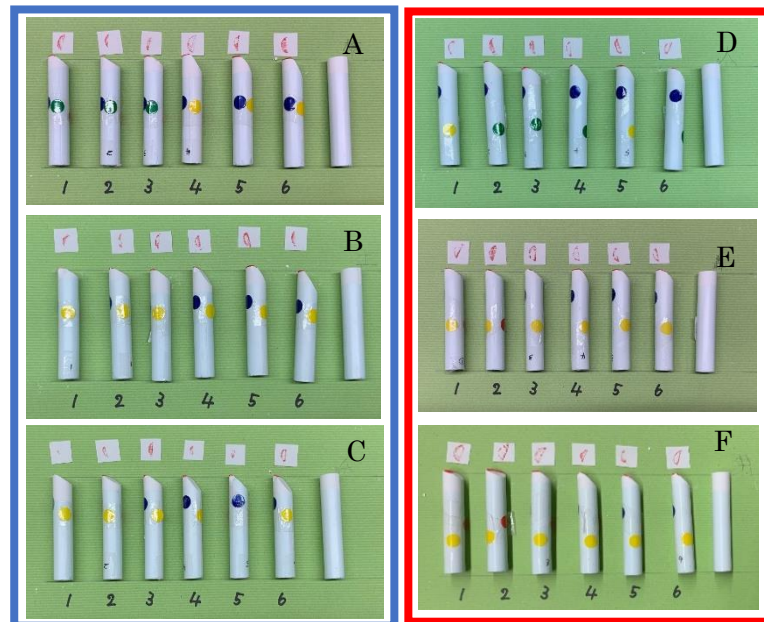
	①	②	③	④	⑤	⑥	Average
D	-0.23	-0.32	-0.28	-0.52	-0.4	-0.14	-0.315
E	-0.24	-0.22	-0.21	-0.43	-0.38	-0.36	-0.307
F	-0.16	-0.17	-0.2	-0.44	-0.33	-0.3	-0.267

Figure3.The difference of group2’s weight

Overall average is 0.296g.Group1’s chawks were more sharpened than group2’s ones and often chipped.

〈group1〉

〈group2〉



Group1 was more chipped than group2 because the part dyed red was small and top was sharp.

HOW CAN WE PROTECT CHALKS?

2-5 group: 16 Tokunaga Tamaki Iijima Kanon

Abstract

In classes, some teachers often break chalks. And we could not concentrate on our class because of it. However, we don't know the solutions. So we offer experiment from two points, the angle and the length. Then we learned that chalks can be protected when held closer to the blackboard and in a less tilted position.

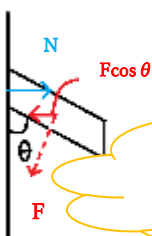
1. Introduction

[1] Object

If chalks will not be broken, we can concentrate on our classes, and we can protect the earth.

[2] Hypothesis

① Angle




If the angle between a chalk and a blackboard is bigger, we can protect chalks better.

According to the balance of the power, $N = F \cos \theta$

So if the angle is bigger, chalks won't be pushed.

② length



If the length between a chalk and a hand is shorter, we can protect chalks better.

According to moment of force, $M = Fl \sin^2 \theta$

So if length is shorter, moment of force is smaller.

2. Methods/Research



Push the chalk and record the result whether be broken or not.

[1] requirement

New yellow chalks

[2] angle

$\theta = 15^\circ 30^\circ 45^\circ 60^\circ 75^\circ 90^\circ$

※we also checked $50^\circ 55^\circ$ as an additional experiment

[3] time 3times



Pull the spring scale and record the weight when a chalk turns.

[1] requirement

New yellow chalks

[2] length

$l = 3.2 2.7 2.2 1.7 1.2 0.7$

[3] time 3times

3. Result

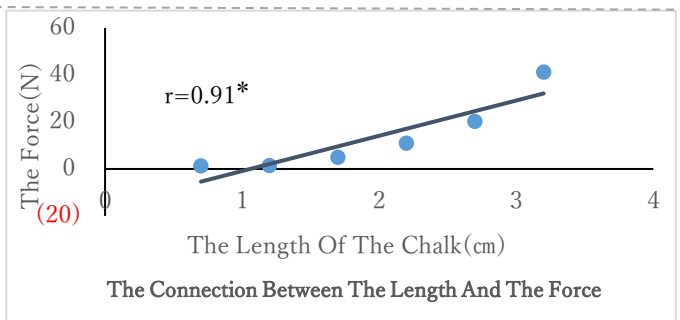
15°	30°	45°	50°	55°	60°	75°	90°
○	○	○	○	×	×	×	×

From 15° to 50° → chalks was broken

From 55° to 90° → chalks was protected

4. Discussion

- ① Chalks can be protected when held in a less tilted position.
- ② Chalks can be protected when held closer to the blackboard.



The longer the length is long, the bigger the moment of force is.



The Relation Between Surface Area Divided by Volume of Ice and the Time for the Ice to Melt

2-6 Sayane Nakajima Waka Maruyama Marika Mizuno

1 Abstract

Whether it is applied to the ice that the larger body of animal is the less heat it emits was proved to be true in this research by melting ice in an incubator.

2 Introduction

Animals living in the arctic and the Antarctic has bigger build than those living in the other areas. This is because they can keep the heat in by making the proportion of the surface area per the volume of their bodies small. Then the thought occurred it might be said the ice melts in the same rules. So, this subject was set. In addition, the thought came up that the time which takes for the ice to melt is longer when the surface area divided by volume of ice is small than it is large as a hypothesis for this subject.

3 Methods

Five pieces of ice were put in an incubator (fixed the temperature to 28°C). They were made by pouring purified water in paper cups and each ice had different volume, 25ml, 30ml, 50ml, 60ml, 75ml, respectively. Each length of time from when they were put in the machine to the moment when the first drop separate from the ice was recorded. (figure 1)



Figure 1: Five pieces of ice in an incubator

The next two figures are showing the time which took for the ice to melt in experiments and the information of the ice : volume, surface area and surface area divided by volume.

Figure 2: Time for ice to melt (second)

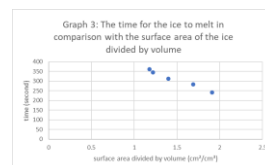
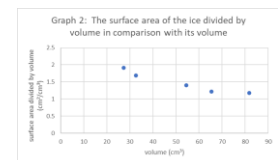
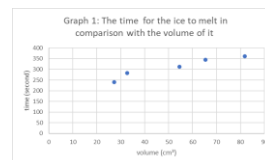
mass	①	②	③	④	⑤	⑥	average
25ml	288	298	224	244	237	198	248
30ml	307	297	267	255	301	159	264
50ml	306	340	335	297	319	207	301
60ml	390	386	357	340	342	216	339
75ml	400	401	369	353	337	297	360

Figure 3: Surface area, volume and surface area divided by volume

mass	surface area(cm ²)	volume (cm ³)	surface area divided by volume
25ml	52.2	27.3	1.91
30ml	55.3	32.7	1.69
50ml	76.4	54.5	1.40
60ml	79.8	65.4	1.22
75ml	97.0	81.8	1.18

4 result

The next three graphs are showing the median of the result of the experiment which was carried out six times. (Graph 1, Graph 2, Graph 3)



These three graphs are showing the median of figures which measured in the experiments.

5 discussion

The graph of the time for the ice to melt in comparison with the surface area divided by volume seems to be a linear function. From this result, the hypothesis is said to be true. Also, it proved to be that the relation between the volume and the time to melt is like a linear function. As a perspective, it might be said that the change of temperature inside materials is related to the surface area divided by volume.

How to study to get a high score on the word test

~memorizing words by writing them VS memorizing words by pronouncing them ~

2-6 7

Omi Kaori Kikuchi Mayu

Abstract

When memorizing new words, which is the best way to memorize the word “memorizing it by writing” or “memorizing it by pronouncing?”

In this study, collaborators learned Spanish words in two ways “just read” and “just write”. It was investigated which method was used to get a higher score in the word test. However, no significant difference was seen.

1 Introduction

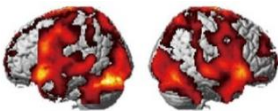
The purpose of this paper is to clarify which is better, writing many times or pronouncing many times, as a way to memorize English words to get a high score in a word test.

Needless to say, it would be better to use both of the two methods for memorizing words, but this study compare the scores of the words test when memorizing words by only one method.

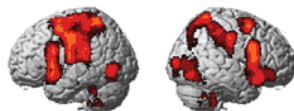
The following hypothesis was made.

“A test of words memorized by pronouncing many times will give a higher score”

There is good evidence to prove the above hypothesis.



The state of brain when reading aloud



The state of the brain when writing

2 Method

- 3 people cooperated in this experiment.
- Since English proficiency varies greatly from person to person, Spanish was used instead of English in this experiment.
- collaborators memorized 10 Spanish words in 7 minute, then a spelling test was done on all 10 words.
- The words test was performed 20 times: of the 20 test, 10 test ask the spelling of word memorized by writing, and the other 10 tests ask the spelling of words memorized by pronunciation.
- The 20 test questions are all different, but the difficulty of the test is the same for all 20 tests.

3 Results



4 Discussion

These results lead to the conclusion that no matter which method was used to memorize the points.

It may not be that the collaborators mechanically did the work of writing the words and the work of pronouncing the words, and did the experiment with a strong will to memorize the words.

Therefore, the effect of memorizing words by writing and the effect of memorizing words by pronouncing may not have been exhibited to the extent that they are reflected in the experimental results.

5 Bibliography

河島隆太(2003).『脳を育て、夢をかなえる』. くもんジュニアサイエンス

A difference of memory between reading aloud and writing

~By using Spanish words~

2-6 ⑧ Akuzawa Moka Yasufuku Misaki

Abstract Testing two ways of remembering words in Spanish, only reading or only writing the words, it might be able to get better scores on English tests by reflecting the result.

Purpose This research show that which is easy to remember, to read aloud or to write within a certain time. So, you could apply this investigation not only learning foreign language, but also your daily life.

Hypothesis Reading Spanish words aloud could be able to remember them well than writing them because one of the condition to memorize has repetition. It is reading that we can repeat more during the given time. Therefore, reading is better.

Methods

No.1 Students were made to remember Figure1 in three minutes by reading them or writing them.



No.2 They wait for a minute without doing anything.



No.3 The Figure2 test was done by them.



Figure1

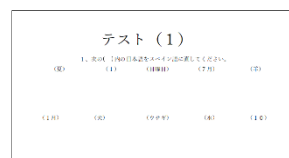


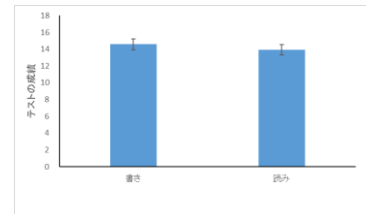
Figure2

* How to score

- The spelling is correct → 2 points
- One-letter deletion, insertion, and replacement → 1 points
- Other mistakes → 0 points

result

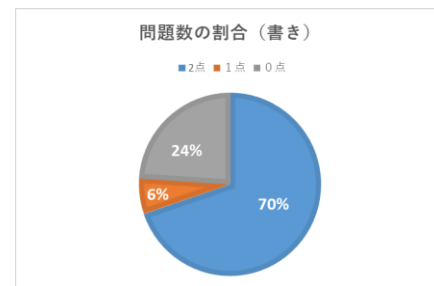
Graph.1 shows average scores under the conditions.



Graph.1

From these graphs, there was a slight difference between the two conditions, and writing was 0.66 more than reading aloud. However, there was not a difference statistically.

Graph.2 shows the proportion of points scored per question. From these graphs, the rates were almost same in either condition. Reading was 4% more than writing in the case scored 1 point, while writing was 5% more than reading in it scored 2 points.



Graph.2

In addition, the case where the total score was 20 points was 13% under the condition of writing and it was 10% under the condition of reading.

Discussion

From these subjects, there being very few gap between reading aloud and writing, it did not find which is better to remember the words. So we want to carry out additional research on silent reading. If it is able to remember as many as reading aloud and writing, it will be useful in our life to remember something.

What kind of lights that discolor the most?

2-6 10 班 Karin Miwa Honoka Suzuki Aoi Sirakura

<background of making a decision>

To prevent discoloration of important books and photos of precious person.

The experiment that researching degree of discoloration of paper due to difference in light color couldn't be run, since it needed a long period of time and a large room.

<Hypothesis and Prediction>

Black light is the most discolored paper,

Reason : The substance called `lignin`, the paper contain reacts ultraviolet rays.

<Program of inspection>

Material: · black light · LED · incandescent light bulb
 · cheap and low-quality paper x4
 · cardboard · shading seat

Why we use cheap and low-quality paper?

It is because cheap and low- quality paper contain lignin.

Method : 1 , The devices was made.<image1>

Why the devices are covered with shading seat?

Shading seat prevents other experiment from affecting to leak light.

2 Four kinds of light in the dark room were gone with.

- black light · LED · incandescent light bulb
- No <image2,3>

Why we made no light?

It is because we want to go control experiment.

3 The degree of discolored paper was examined with color leader every week.

<An inspection result>

Unexposed paper had changed color,too.

LED : It had the same result as unexposed paper.

An incandescent lamp : The paper did not change color so. But two weeks later,it changed color.

Black light : Since a week had passed, its color quite had been changing.

LED	1week	2week	colorless	1week	2week
sample1	2.5Y 8/1	10YR 8/1	sample1	2.5Y 8/1	10YR 8/1
sample2	2.5Y 8/1	10YR 8/1	sample2	2.5Y 8/1	10YR 8/1
sample3	2.5Y 8/1	10YR 8/1	sample3	2.5Y 8/1	10YR 8/1

ILB	1week	2week	BL	1week	2week
sample1	2.5Y 8/1	10YR 8/1	sample1	10YR 8/2	10YR 8/2
sample2	N 9,5	10YR 8/1	sample2	10YR 8/2	2.5Y 8/2
sample3	N 9,5	5Y 8/1	sample3	7.5Y 8/1	2.5Y 8/2

<Consideration>

Black light is the most discolored. It has great influence on discoloration to be exposed to ultraviolet rays, being sure.

Unexposed paper changes color ,too. It is found that there are factors except for light ,so doing compound experiments might be interesting.

<image1>

<image2>



<image3>



Investigation on using erasers

~The situation of erasers when they have covers or not and are changed the angle~

2—6 11 Rena Motosuga Karen Hayashi

Object

- Breaking the eraser can be stressful
- The broken eraser is small and difficult to use



Find a way to make the eraser harder to break.

Experimental method

Change conditions

- Angle to erase the eraser
- With or without cover

Erase until the eraser breaks.

1 Experimental equipment creation



2 Experiment

Angle : 30° 45° 60° 90°

Cover : with without

8 patterns in total
3 times each

Experimental result

• Weight of eraser dust(g)

	30°	45°	60°	90°
1	2.17	1.42	0.64	
2	2.64	2.50	0.53	
3	2.71	2.13	0.62	
average	2.51	2.01	0.93	

※Originally weight 11.3g

- 90° did not function as a eraser
- Only those with a cover broke

Consideration

- The larger the angle of the erasers , the easier break
- The main cause of the eraser breaking

The eraser was broken the place which is between it and the edge of its cover.



The eraser is cracked due to eating into the cover.



Break

The Best Blade Angle Of Dutch Windmill

~In order to increase the spin by time unit~

2-6 ⑬ Mayuna Tsukada , Yui Bannai , Mahito Mori

ABSTRACT

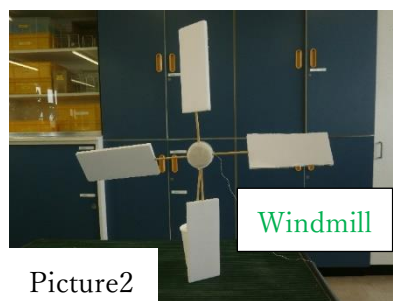
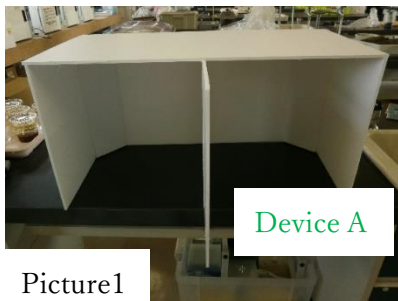
What is the trick of efficient wind power generation? For the purpose of figuring it out, the research of the angle of the blades to the wind was carried out.

1 INTRODUCTION

PURPOSE: Making it widespread to generate power with wind, and contributing to provide environmentally sustainable energies.

HYPOTHESIS: Since current Dutch windmills are used at 45°, at that degree to the wind, the windmill would spins most.

2 METHODS & RESEARCH

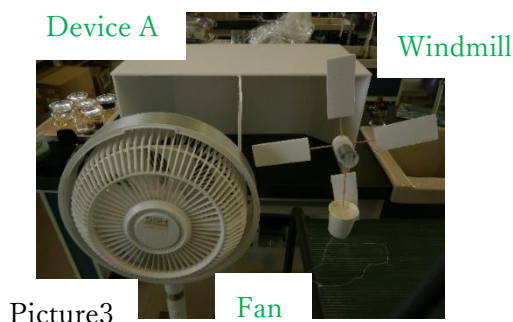


☆These devices were used.

※Picture 1 shows the “Device A” used in order to make wind uniform.

※Picture 2 shows the windmill.

※Picture 3 shows form of all devices.



※The length of the twining around windmill was measured.

※Each experiments were done for 10 seconds.

※The distance between windmill and Device A was 15 cm.

※Wind was generated by fan, and wind speed was 0.8[m/s].

5 REFERENCE

<http://www.kobe-kosen.ac.jp/~waseda/wtgpapermodel/2017-wtgpmp-introduction-J-wl.pdf>

『磁石ナビ | 風力発電の基礎シリーズ (6)』

<https://www.neomag.jp/mailmagazines/topics/letter201205.html>

『揚力型水平軸風車（風力タービン）が回転する仕組み超入門（β版）』

3 RESULT

Figure 1

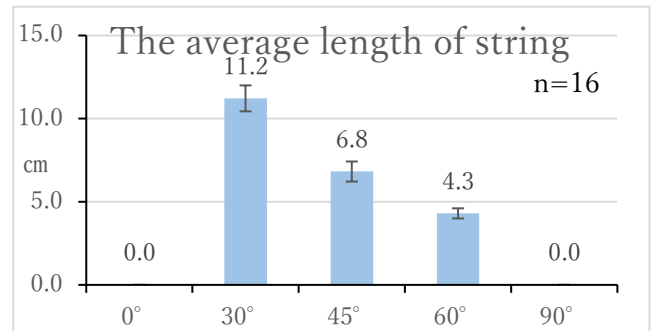


Figure 1 shows that at 30° to the wind, the windmill spun most. At 0° and 90°, it did not spin at all.

Figure 2

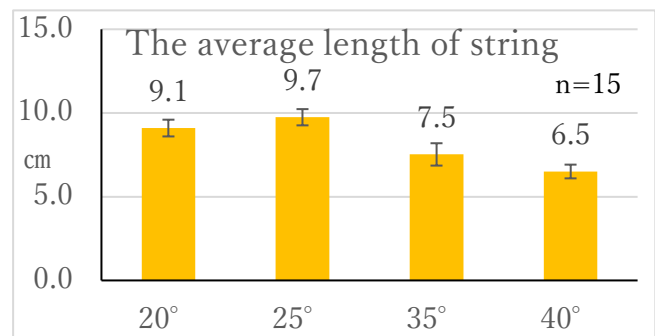
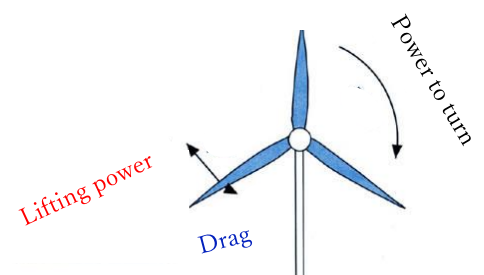


Figure 2 indicates that the windmill spun most at 25°.

4 DISCUSSION

In order to maximize the number of times spin, two factors are predicted. At 30°, wind power is stronger than any other angles. In addition, it probably gives the strongest “lifting power” and the least “drag” to the windmill.



A windmill spinning with lifting power

Development of a cloth mask free from uncomfortableness

~What kind of cloth does prevent the air inside the mask from getting too hot?~

Group12 2726 Asumi Terada / 2719 Nanami Kogure

【Abstract】

While cloth masks are needed by more and more people, it is concerned that people wearing masks are likely to be heatstroke in summer. To solve this problem, we tried to find out what kind of cloth prevent the temperature inside the mask from getting too hot and humid, using 8 kinds of clothes. It is quite difficult to major how the cloths can block the virus, so we mainly focus on only temperature and humidity inside the masks.

【1】INTRODUCTION

~ Back ground of Research~

It is very uncomfortable to live wearing a mask in hot summer days.

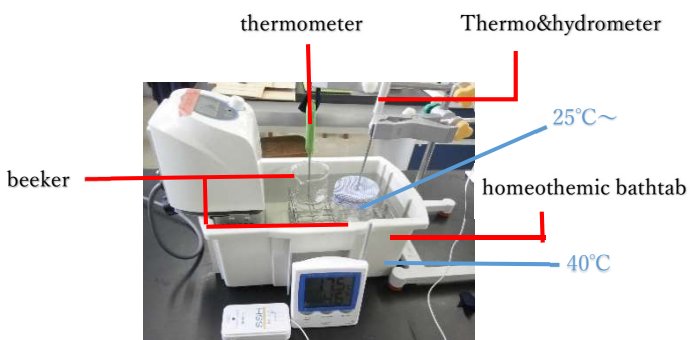
To identify which kind of cloth can keep the air condition inside masks less hot and less humid, we conducted a research.



【2】METHOD AND RESEARCH

1) Research for Relationship between Change of Temperature inside beakers and Kind of Cloths.

▽8kinds of cloths...tweed, corduroy, satin, broad, denim, gingham, sheeting, and seersucker

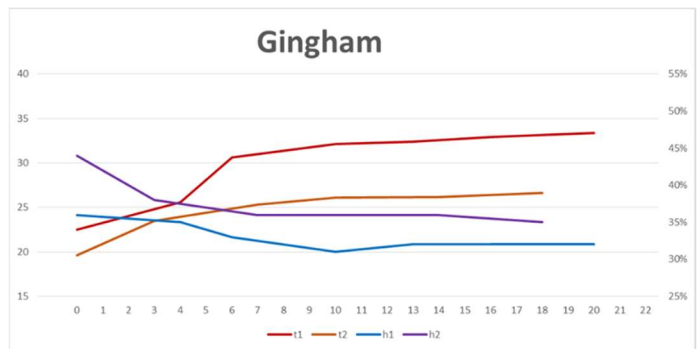


* the temperature and humidity displayed on hydro&thermo-meter vary every four minutes. However, its span could not control strictly.

2) Observation of Surface of 8 Kinds of Cloths with binocular stereomicroscope.

【3】Result

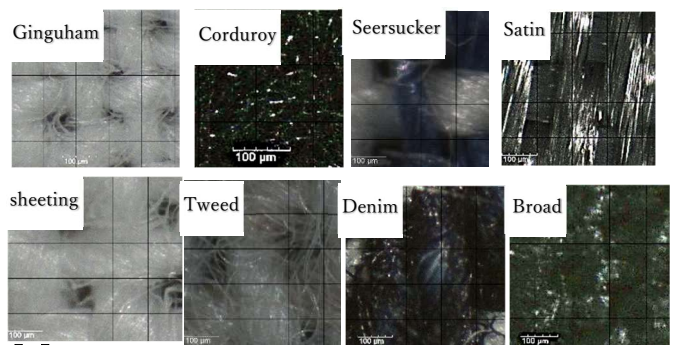
1) Only one of the graphs are placed. (See another sheet for other graphs.)



t1:temperature in first experiment t2: temperature in second experiment

h1:humidity in first experiment h2: humidity in second experiment

2)



【4】Discussion

It is unclear that which kind of cloth can keep the air inside beaker less humid and hot.

We could not associate research 1 and 2.

→Using too many kind of cloths, we could not conduct research only two times with each cloth,

There were differences of temperature and humidity even when same kind of cloth was used.

→We could not control the temperature of the room where experiments are conducted.

【6】Reference

Yomiuri newspaper online <https://www.yomiuri.co.jp>

Best position of masking tape



2-1 Tanaka Yui

1 Abstract

This study is about masking tape. Four ways of pasting were tried and decided the most difficult way to come off.

This conclusion, the way of putting on two places up and down was the best.

From this result, it is better for masking tape to paste in the middle than in the corner.

2 Introduction

Masking tapes are easy to move, but attractive tools.

But it is going to be peeled soon, so there might be a craft that cannot be peeled.

This search's purpose is to examine how to paste that cannot be peeled the best.

Hypothesis is masking tapes put it on four corners, sideways, and the wall-to-paper ratio of adhesion of it is one-to-one.

3 Methods/Research

- Tools eight pieces of paper, masking tape, wall
- Eight pieces of paper were put it with masking tapes on the wall. Four pieces were peeled by the window. The others were not by the window.
- Length of a masking tape was 5cm, the wall-to-paper ratio of adhesion was one-to-one. 2-stage configuration. By the window ⇒A Not ⇒B
- Period 10.26~11.24
- ①Four corner leaning ②Four corner sideways ③Four corner lengthwise ④Two places in the middle up and down

4 Result

The number is in order of hard to peel off.

	①	②	③	④
A	No.2 Gap in the tape was expanded.	No.4 Peeled off at lower left.	No.3 The tape was loosen and twist.	No.1 No change
B	No.2 Gap in the tape was expanded.	No.4 Peeled off at right side.	No.3 The tape was loosen and twist gradually.	No.1 No change

5 Discussion

- It may be better for masking tape to paste in the middle than in the corner.
- Pasting in the corner, gap is born in the middle of paper, and expanded, so it may be going to take it off.
- ③ was seen a twist, wind generated from motion of people may have effect on it.

Duration of Sunscreen Effect

2-2 Nakagawa Misaki Nakamura Hina

Abstract

In summer, even the skin with sunscreen will burn. The interval to reapply sunscreen becomes clear by knowing sunscreen effect time. To address the problem, we examine the UV intensity of each elapsed time, with and without sunscreen and it turns out the effect time of sunscreen can be predicted to be about 20 hours under normal time, and it turns out it is about 4 hours under sweating.

1.Introduction

The skin is burnt even if it wears sunscreen in the situation of doing club active outside in the summer. The skin can be prevented from burning even a little by clarifying the effective time of sunscreen and knowing when to reapply sunscreen.

<Hypothesis>

Normal time ; keep effect for 2hours

When sweating : keep effect for 0.5hours

2.Methods/ Research

Prepare three cardboard boxes with cellophane on the top.

A:Nothing is applied to cellophane

B:Sunscreen was applied to cellophane

C:Sunscreen was applied to cellophane and sprayed with water.

Place A, B, C in a sunny place and measure the UV intensity in each cardboard box with a UV intensity meter.

When the UV intensity of B and C approaches the UV intensity of A, the sunscreen is no longer effective.

3.Result

Two experiments were conducted.

① Measure every 5minutes → 2hours 10minutes

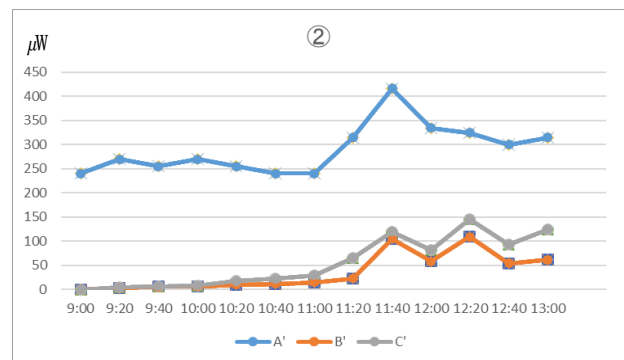
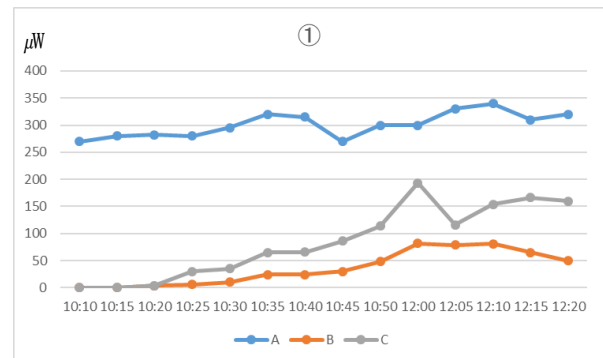
↳The final UV intensity of B is about 1/6 of A.

The final UV intensity of C is about 1/2 of A.

② Measure every 20minutes → 4hours

↳The final UV intensity of B' is about 1/5 of A'.

The final UV intensity of C' is about 1/2 of A'



4.discussion

This experiment was depended on the climate. The experiment was conducted from autumn to winter and the UV intensity was weaker than in summer, so it was not possible to know for sure how long the sunscreen was effective. From the results, the effective time of sunscreen under normal conditions is about 1/5 of that when sunscreen is not applied, and about 1/2 of that when sweating is not applied. It can be predicted that the effective time of sunscreen in 20hours under normal condition and 4hours under sweating. Next, we want to experiment in the strong UV condition in summer.

Is it true that drinks can dissolve teeth?

2-2 group7 Kogure Ayaka Sato Maine Sato Yuna

Abstract

We heard that drinking Coca-cola can dissolve our teeth, so we conducted this experiment. We soaked the backbone of the saury in various drinks to see if would dissolve. The result was that the one soaked in lemon juice dissolved the most. This suggests that acid is responsible for the dissolution of bones.

1. Introduction

[1]Background of the theme decision

We have often heard that drinking Coca-Cola can dissolve our teeth, so we want to find out, regardless of whether it is harmful to our body or not.

[2]Hypothesis

We think the more acidic the liquid, the better the bones dissolve because we have learned the following chemical reaction formula.



2. Methods

《1》Soak the bones and liquid in a cup for a month and measure the length every day.

《2》Measure pH and the sugar content of the liquid.

○ Calcium phosphate, the main component of teeth, is also the main component of bones. So the backbone of the saury, cut into 5cm pieces, was used in place of the teeth.

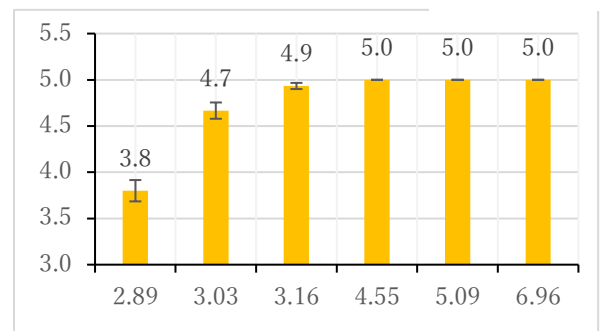
Use of objects ※40ml were used for each drinks

- Backbone of the saury
- Water
- Coca-Cola
- Coca-Cola Zero
- Fruit juice (100%Apple juice)
- Carbonated water
- Aquarius
- Lemon juice
- Vinegar
- Soy sauce

【Graph1】

		High sugar ranking
1	Soy sauce	34.4
4	Lemon juice	7.8
9	Water	0.0

【Graph 2】



3. Result

- ① The bones soaked in lemon juice became the shortest. The visual change was also very large. (Graph2)
- ② For water, carbonated water, and soy sauce, there was almost no change in length or visual appearance. These three liquids were also the three with the highest pH values among the liquids. (Graph2)
- ③ The highest sugar content of the liquid was in the soy sauce but the lemon juice, which dissolved the most, did not have a very high sugar content. (Graph1・2)

4. Discussion

There is a relationship between the length of bone discussion and, pH, and it is found that fluids with low pH values, which indicate strong acidity, dissolve bone.

Sugar content does not have much to do with the dissolution of the bones because the length and appearance of the bones do not change even when the sugar content is high, as in soy sauce.

IN ORDER NOT TO ISSUE A SOAP SCUM IN HARD WATER

2-3 Sasaki Haruka Takami Maya

ABSTRACT

As a result of adding familiar chemicals to hard water and detergent in order to find a way to prevent soap scum even when using hard water and it was found that the use of acidic substances improved the fluffiness and prevented soap scum.

METHODS & RESEARCH

EXPERIMENT ①

The reason there is a difference in foaming

METHODS

① Put 100 ml of hard water and soft water in a beaker, add additive-free detergent and synthetic detergent, respectively and make a total of 4 types of aqueous solutions.

② After mixing with a glass rod, observe

RESULT

hard water	Additive-free	It became cloudy white and soap scum was formed.
	Synthetic	It can't make soap scum
Soft water	Additive-free	It can't make soap scum
	Synthetic	It can't make soap scum and foams well

CONCLUSION

Soap residue does not come out when using acidic substances and turned out to foam firmly.

This is because hard water and detergent are alkaline neutralized by acidic substances, soap scum turned into water-soluble or it is thought that it is because soap scum can no longer be formed, or it is thought that it is because soap scum can no longer be formed. In the future, I would like to find out whether the soap scum has changed to one that dissolves in water or whether the soap scum can no longer be formed.

REFERENCE

<https://www.evian.co.jp/>

<https://contrex.jp/sp/about/component/index.html>

EXPERIMENT ②

To fill the difference in foaming

METHODS

① Put 100 ml of hard water in a beaker, put 0.1 ml of additive-free detergent, and put 2.0 g of chemicals.

② Mix in a beaker 50 times with a whisk

③ Observe if the detergent is foaming

Sodium chloride	to become cloudy
Potassium chloride	to become cloudy
sodium hydrogen carbonate	to become very white and muddy and the bubbles disappear quickly
citric acid	colorless transparency keep foam long
Lactic acid	colorless transparency foam long
Carbonated water	colorless transparency rough foam but long lasting

A search for a relation between water hardness and hand soap bubbles

2-3 Group5 Ozu Momoko Ogiwara Kaho

Abstract

We researched the relation between water hardness and babbles with handmade water softener. It was found out that water hardness affects water's lather.

1 Introduction

(1)purpose

It is known that water foams well compared to hard water. To know what it has to do with hardness and bubbles in detail, we started this research.

(2)Hypothesis

The lower the hardness of water, the higher the foam layer.

※Bubbles layer is defined as good foam.

2 Methods

①To reduce the hardness of water, a plastic bottle, ion exchange resin and a filtration matt are used.(figure1)



(figure1)Handmade water softener

② Water classified into the number of times they were filtered.

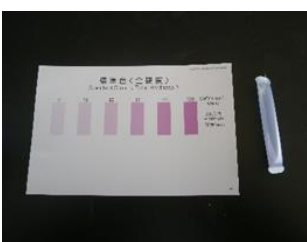
③ Whip up each water 10 times with hand soap.

④ Measure the height of the bubbles and seek the average of the level of the bubbles each time.(figure2)



(figure2)A layer of bubble

And then, we researched water hardness with ION SELECTIVE PACKTEST. (figure3)

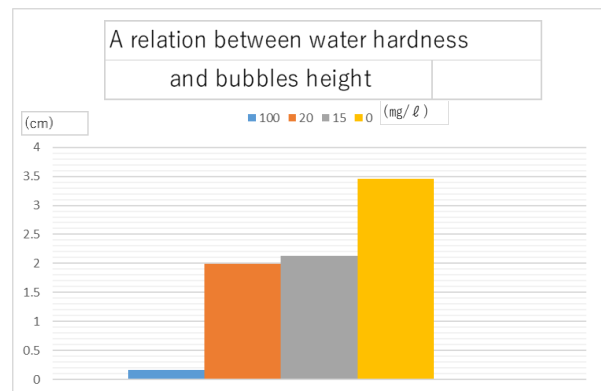


(figure3)A PACKTEST kit

Non filtered water's hardness is 100 mg / ℓ .
3times filtered water's hardness is 20 mg / ℓ .
5times filtered water's hardness is 15 mg / ℓ .

10times filtered water's hardness is 0 mg / ℓ .

3 Result



- It cannot be seen the difference between 20 mg / ℓ and 15 mg / ℓ .
- 0 mg / ℓ can be seen a clear advantage.
- Scarcely any bubbles are seen in the 100 mg / ℓ .

4 Discussion

The filtered water became more foam than water, but there is hardly any difference between 15 mg / ℓ and 20 mg / ℓ .

Therefore, low hardness water bubbles well compare with water. However, foam is not in direct proportion to water hardness.

5 Referance

「Serbian Walker のブログ」

<https://www.serbianwalker.com/blog/>

「モリモリ！美容ブログ〜お肌と財布と、地球に優しく♪」

<https://link.blogmura.com/out/?ch=10079358&url=http%3A%2F%2Fnonnonnspring.blog98.fc2.com%2F>

Natural Material for Sponges

2-5 group 5 Yakumo Ishii, Lisa Kaneko

1. Summary

Sponges we use in our lives are made of plastic. They are bad for the environment because most of them are made of oil and disposable. Plastic wastes are said to cause marine pollution. To address the problem, we examined what is the most useful natural material for washing oil stain out.

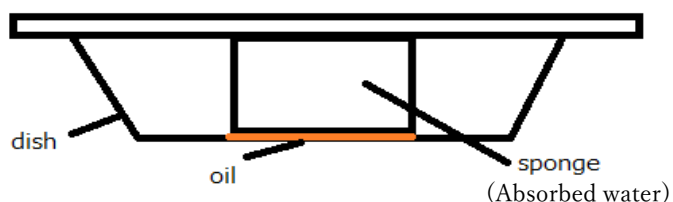
2. Introduction

Target of our experiment

...Loofah/hemp/cotton/palm/absorbent cotton

① Connecting the targets with oil

Weighing the mass of the targets before the experiment and after that.



② Making the targets absorb water

Make the targets absorb water as possible as they can. Then weigh the mass of the targets before the experiments and after that.

③ Observing the targets

Observe the fiber of the targets by a microscope.

3. Result

①	1[g]	2[g]	3[g]	Average[g]	
loofah	0.29	0.23	0.02	0.18	
hemp	0.12	0.18	0.21	0.17	
cotton	0.16	0.64	0.32	0.37	
palm	0.41	0.10	0.34	0.28	
absorbent cotton	0.10	0.47	0.18	0.25	
sponge	0.20	0.13	0.20	0.17	
②	1[g]	2[g]	3[g]	4[g]	Average[g]
loofah	5.55	6.47	4.85	6.73	5.90
hemp	6.39	6.10	10.29	9.61	8.10
cotton	16.27	3.11	4.90	6.15	4.72
palm	6.20	4.15	5.62	6.33	5.58
absorbent cotton	23.63	21.28	18.86	20.49	21.07
sponge	18.3	19.29	20.73	23.73	20.51

4. Discussion

① cottons and palms connected with more oil.

→ a thread of cottons is made by twisting its fibers.

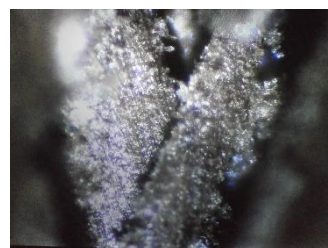
→ a fiber of palm is rough.

② absorbent cottons could absorb and maintained.

→ absorbent cottons' fibers is the thinnest and connecting most complex in the targets.

①② the more target absorbed water, the least target connected with oil.

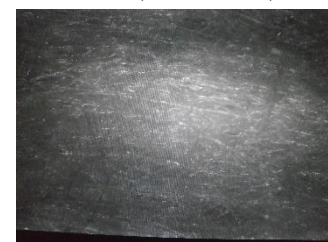
→ absorbed water kept oil from connecting with.



Palm (× 4.0 × 10)



Cotton (× 2.0 × 10)



Absorbent cotton (× 2.0 × 10)



Loofah (× 2.0 × 10)

5. Conclusion

In those experiments, the best target was different each experiments. So the best material for both points was not found.

The targets used in this examine on the market. So the surface area, mass, and volume could not be unified. This seems to be a cause that led the results unexpected.

While those would be unified, we would like to examine about the natural materials' skill to wash oil that be leaved for longer time and set.



Eliminate eraser waste



2年7組4班 王 佳妮 梶間 瑠湖

[abstract]

In order to use erasers without as much waste, we thought about how to recycle the used erasers.

At first, we tried to melt and reshape them, but since we needed a large-scale equipment, we changed our experiment to forming an eraser using a binding agent. When Chikaballoon and glue were mixed at a ratio of 1:2, it was easiest to erase.

[introduction]

Purpose: Use a small worn-out eraser without waste

Verification content: ①Melt and mold ②Use a binder to combine an eraser

Verify if the eraser can be reconstituted by doing ①and②

[Methods/Research]

Experiment 1 : ①Mix ethanol and essential oil as a plasticizer and heat →Ignited

②Put an eraser in a pan and heat it →Burnt

③Hot water →Not a high enough temperature



The experiment was not possible because the equipment available at school is not large enough.

Experiment 2 : Use Oyumaru as a binding agent →it becomes clay-like and as weak adhesive strength, making it unsuitable.



Experiment 3 : Harden the gum and eraser, Harden the chikaballoon and eraser. Grind them and mix with chalk.→They would not erase and chalk powder was not suitable. ↓

Try using gum, chikaballoon and glue as a link

Experiment 4 : Mix the gum with an eraser and change the combination of ingredients and compare the ease of erasing.→The one that was mixed completely was the easiest to erase with.

① \ ②	0.5g	1.0g	0.25g
0.5g	 1▲2×3○	 1△2○3○	 1▲2×3◎
1.0g	 1◎2◎3○	 1×2▲3×	 1△2◎3○

① Chika balloon
② Glue

Experiment 5 : Find out the optimal ratio of glue and chikaballoons.→0.5 / 1.0 is the best

① \ ②	0.3g	0.4g
1.0g	 1×2×3▲	 1○2×3×

1. The ease of erasing
2. deformation
3. Amount of eraser residue

Best : ◎ Good : ○ Soso : △
Bad : ▲ worse : ×

[Discussion]

Chikaballoon serve as softeners and binding agents.

The glue is softened by chikaballoon and can be easily reformed, making it easier to contain the eraser.

Chikaballoon : Glue = <0.5 : 1.0 > or <1.0 : 2.0 >

When it is dried, it loses moisture and become hardens, so it becomes difficult to deform and it becomes more difficult to deform and it becomes easier apply force.

This way is enough to recycled the eraser, but it cost time and labor, so we try to recycled more easily.

① \ ②	1.0g	0.5g	0.75g
2.0g	 1◎2△3○	 1×2▲3×	 1○2△3▲

[Referance] ・「消しゴム工場 | トンボ KIDS | トンボ鉛筆」

<https://www.tombow.com/sp/kids/eraser/factory.html>

・「消しゴムはどうやって作られる?自由研究にも使える家庭でのつくり方も」 <https://cocoiro.me/article/27911>

Effect of sunscreen ~Focusing on PA content~

2nd grade M.Oshima M.Kawahara

<Abstract>

We focused on UVA, which is said to have the greatest effect on human skin. Then, the bananas were coated with sunscreens with different PA contents and exposed to sunlight. As a result, no change was seen in the banana peel.

<Introduction>

1. Purpose

To know the difference between the effects of PA2⁺ and 4⁺

2. Provisional

Reapplying PA2⁺ every two hours has the same effect as PA4⁺.

<Methods/Research>

1. The banana peel was put a transparent cellophane tape on (The banana had been placed in the darkroom for two days before the experiment day).

2. On top of that, we apply 0.3g of each sunscreen. And we put it in the sun for 5 hours.

3. We wrap the banana in aluminum foil and leave it in the darkroom for two days.

<Result>

The experiment was repeated 4 times, but the color of the banana peel did not change.



Before



After

<Discussion>

One of the reasons for the failure was the lack of sunlight. So there was no change in the banana peel. The other is that sunscreen manufacturers are different. Therefore, the expected result was not obtained.

<Reference>

http://anessa.shiseido.co.jp/shigaisen/spf_pa/

A weed-killer that can be made at home without chemicals

2-7 Team⑧ Kaori Kitadume Yukino Takada Yuki Nagao

Abstract

This research was done for the purpose of making the most effective weed-killer which was harmless for both human body and environment. This experiment was conducted by changing concentration of acid or alkaline things. As a resale, 10% solution of citric acid whose pH was the smallest worked the best.

1, Introduction

(1) Purpose

To make a weed-killer that is harmless for yourselves and environment.

(2) Hypothesis

Weed can be killed by acid things or alkaline things.

Example vinegar, citric acid, bicarbonate.

(3) The conclusion of tentative experiment

It is considered that acid things can kill weeds.

2, Methods

- ① make pots by using plastic bottles
- ② plant weeds that are the same kind and size in them
- ③ spray water on them 10 times with a sprayer
- ④ make the following liquids
 - (i) A 10% solution of citric acid
 - (ii) A 5% solution of citric acid
& A 5% solution of vinegar
 - (iii) A 5% solution of citric acid
& A 5% solution of bicarbonate
 - (iv) Only water
- Spray each liquid on weeds 20 times
- ⑤ Observe the changes of color of weeds

3, Result

The pictures on the upper right are the looks of weeds that are left for 1 week after the operation ④.

The root of item(i) and item(ii) became red.

Especially item(i) changed markedly.

Item(iii) and (iv) had hardly changed for 1 week.

It is because acid (citric acid) and alkaline(bicarbonate) were neutralized.



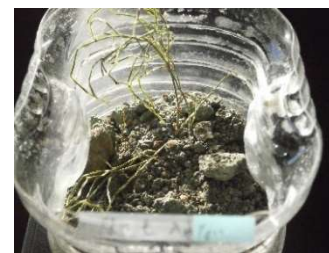
item(i)



item(ii)



item(iii)



item(iv)

4, Discussion

General cells cannot grow outside pH from 4 to 8.

※ pH from 4 to 8 = .

<tentative experiment>

	pH	Difference from .
5% vinegar	About 2.7	-1.3
5% citric acid	About 1.6	-2.4
5% bicarbonate	About 8.5	+0.5

5% acid worked because there is the largest difference from .

<This experiment>

	pH	Difference from .
(i)	1.4	-2.6
(ii)	1.9	-2.1

(i) worked better because there is larger difference from . than (ii).

5, Reference

<https://kagakucook/citric-aid-ph>

<https://www.mashley1203.com/entry/2019/07/14/063000>

How far can the sunscreen be put on your skin.

~Change the temperature and pressure of water~

2-7-9 kaho ikeda haruna nakajima

Abstract

Be interested in sunscreen performance. So we researched sunscreen resistance by changing condition, and considered.



1. Introduction

Why we set this theme is that makes it easier how often sunscreen should be put on by knowing how much water will remove it. And we think it is useful for our daily life.



2. Methods

First, the sunscreen is put on our palm a circle five millimeter in diameter and spread the side of a 3 cm.

Then the water that changes the temperature of 40°C 30°C 20°C 10°C is dropped from 15cm 30cm 45cm each.

Finally, compare how much sunscreen remove after water.

3. Result

	10°C	20°C	30°C	40°C
15cm				
30cm				
45cm				

※Left side pictures show before and right side pictures show after.

4. Conclusion

- The higher water, the more pressure, the easier the sunscreen was dropped.
- The temperature and pressure that cannot drop sunscreen is 15cm-10°C 15cm-20°C 30cm-10°C.

Enhance the ability of waterproof sunscreen

~aim for wonderful waterproof~

2-7 Satsuki Kitazume Moe Yamada

Abstract

When we go into the water, there's fear that sunscreen might come off and get sunburned.

So, the purpose of our study is to enhance the ability of water-resistant in the water without spoiling the effect of protection from the sunlight.

Hypothesis

Sunscreen mixed oil can remain on the skin longer than normal.

Way of study

*research of *water resistance*

- ① Spread sunscreen on black stocking as a substitute for skin. (picture 1)
- ② Steep black stocking in water, survey the color (brightness and chroma) of sunscreen every 1minutes.
- ③ Read the data showed by a color reader.

*research of resistance to *ultraviolet rays(UV rays)*

- ① Spread three types of sunscreens (A original B mixed Castor oil C mixed Jojoba oil) on a plastic folder respectively
- ② Expose them to the sunlight, using apparatus illustrated picture 2.
- ③ Compare figures among them (A~F).



picture 1



picture 2

Result & Discussion

Experiment

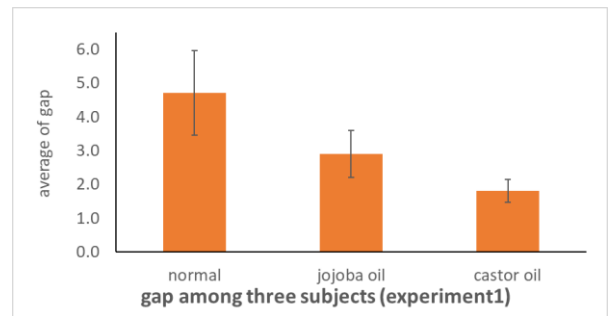
Normal→come off best

Jojoba oil→not come off easily

Castor oil→not come off easily

Conclusion: Sunscreen with oil is stronger to water.

graph



It turns out mixing oil can repel water.

Therefore, emulsification can stronger water resist.

Experiment 2

E & F→a clear plastic folder does not influence to result.

D & E→spreading something does not influence to result.

B & C→mixing oil does not spoil effect of protection from the sunlight.

A & D→a sunscreen protect from UV rays.

table

	A normal	B mixed castoroil	C mixed jojobaoil
UV	0	0	0
	D cream	E clear plastic folder	F none
	46	64	85

