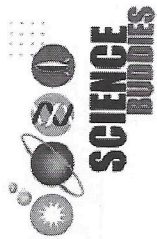


Question Word	Possible Questions (you can think of others)	Substitute your keywords (or variations of your keywords) for the blanks in the previous column. Write down the relevant questions and use them to guide your background research.
Who	Who needs _____? Who discovered _____? Who invented _____? Who _____?	who created vinger, hydrogen peroxide, ammonia, bleach, dish soap, borax
What	What causes _____ to increase/decrease? What is _____ made of? What are the characteristics of _____? What is the relationship between _____ and _____? What do we use _____ for? What _____?	what are chemicals, what is hydrogen peroxide what is detergent, what is ammonia, what is oil what is vinger, what is borax, what is a sharpie what is the stain removing component, what are shirts made out of
When	When does _____ cause _____? When was _____ discovered? When _____?	when was detergent invented would the type of weaving affect the oil saturation natural vs synthetic fabric
Where	Where does _____ occur? Where does _____ get used? Where _____?	Where are white clothes worn the most

4. To analyze the results from experiments you might need to know some **key formulas or equations**. Think about your own experiment and write down any step or task that requires a formula or equation. Don't worry about whether you already know what the formula or equation is—you'll find the actual equation when you do your background research.

List steps or tasks that may require a formula or equation:



Background Research Plan Worksheet

Naughty

Name: Elianna

1. What is the **question** you are going try to answer with an experiment? Which chemicals will remove stains from white shirts the best?

2. List the **keywords** and phrases from your question and the topic in general. (Hint: Use an **encyclopedia** to help you)

Chemicals borax
 Oil dish soap
 Remove vinegar
bleach
shirts

3. Now use your keywords to build some **questions to guide your background research**. Develop at least two or three from each "question word." Don't worry about whether you already know the answer to the question—you'll find the answers when you do your background research. And don't forget to "network" with knowledgeable adults who can help guide you toward good materials!

Question Word	Possible Questions (you can think of others)	Substitute your keywords (or variations of your keywords) for the blanks in the previous column. Write down the relevant questions and use them to guide your background research.
Why	Why does ___ happen? Why does ___ ___? Why ___?	Why is <u>vinegar</u> a <u>chemical</u> ? Why are <u>oil stains</u> so <u>hard</u> to <u>remove</u> ? Why will <u>dish soap</u> <u>remove</u> <u>oil stains</u> ? Why are 'chemicals' <u>important</u> ? <u>so hard</u>
How	How does ___ happen? How does ___ work? How does ___ detect ___? How does one measure ___? How do we use ___? How ___?	How to measure <u>circles</u>

Name: Elizaveta Date: Nov 19 Class: 603

Science Fair Project Hypothesis

Testable Question:

Which chemical will remove oil stains from white shirts the best.

Manipulated Variable: Types of chemicals used

Responding Variable: how much oil has been removed after washing size of oil stain.

Control Variables listed:

-white shirts, canola oil, 1 shirt washed at a time, Washing machine cycle, dryer cycle, same camera.

Hypothesis: Various chemicals are used to remove an oil stain from a white shirt

If I put six different chemicals on six different shirt with the same oil stain

Then bleach will remove the most oil from the shirt

Because chlorine bleach is an oxidizer which has chemical reaction called oxidation which removes certain types of dye and stains

Oxidization

Bleach

Nov 21, 2024

Test 1

- Time: 5: 7:30 E: 8:25
- brown color were bleach was poured
 - very slow spreading across rest of shirt
 - the brown color keeps expanding across shirt
 - air bubbles in between the two layers of the shirt
 - bleach is seeping under sharpie line

Test 2

- Time 5: 7:33 E: 8:25
- brown color were bleach was poured
 - very slow spreading across rest of shirt
 - brown color keeps expanding across shirt
 - some air bubble between shirts at bottom of stain

- Time 5: 7:37 E: 8:25
- bleach brown color expanded has 5 dryers: 8:25
 - some areas have already dried
 - air bubbles under shirt
 - bleach appears brown due to reaction to oil
 - in areas were bleach has dried appear to look

Time captured.

Oil absorbency
Time: 21:15 date:

Time 7:30 END 11:22

massage time: 8:30

wash time 8:32

dry time: 8

Measurement: after

before L 28.2 W 21.5 L 30cm

5:45 30s - 7:32

oil absorbency

Time 7:33 Date 21st

Time 8:30

massage time 8:30

wash time 8:30

dry time 8:30

measurements before after

L 24 W 21.1 L 38 W 27

oil absorbency.

Time 7:37 Date 21

Time.

measurements before after.

L 26.2 W 20cm L 34

W 24.9 time 50min
dryer 30min W 9
5:45 30s 7:37
7:40 end 7:50

Rubbing alcohol

Test 1
Time: 5:21:24 E:

- rubbing alcohol give off very pungent smell
- rubbing alcohol is visible
- appears in areas where rubbing alcohol did not touch
- have thin lint on tips of fibers
- can see air bubbles

Time captured:

Oil absorbency date:

Time END

massage time: 5:27:22

wash time 5:15:35 - 5:22:22

dry time: 5:24:35

measurement: after

before 5:24:35 W 24:5 L 34:5 N 27:9

oil absorbency

Time Date

Time END

massage time 5:27:30 E

wash time 5:15:35 E

dry time 5:24:35 E

measurements 25 after

before: L 28 W 30 S L 30 W 27:3

oil absorbency

Time Date

Time END

before: L 26:5 W 21:5 L 34:5 W 27:9

wash 5:15:35

dry 5:24:35 E 3:35

before: E 4:3:33

dry 5:24:35 E 3:35

Test 2
Time 5:29:11 E: 2:41:11 SITE 2:13:20 BIT Time 5:22:26

- more air bubbles than test 1
- can see where rubbing alcohol was poured
- look like some areas there is high concentration
- shirt feels damp but feels dry

Test 3
Time 5:31:32 E: 3:11:11 SITE 2:14:11 BIT 5:27:30 HUNGSA131

- rubbing alcohol expands the most
- look like rubbing alcohol caused sharpie bleed-through
- can see where rubbing alcohol was poured
- color from garbage bag went on shirt

massage start E END 2:31

5:31:32 E: 2:14:11

Vingel

Time: 5:5:06 E: 5:00
 1123124 1124124
 6:16
 12
 6:04

- Vinger has very strong smell
- Vinger continues to expand
- Some areas high
- Vinger did not cause sharpie bleeding
- Vinger has absorbed into shirt creating and has mixed with oil creating an oil vinger smell substance

Time 5:5:01 E: 5:04
 1123124

- Vinger expanded from original pour and sucking
- air bubbles between layers of shirt
- in some areas high concentration of vinger

Test 3

Time 5:5:07 E: 5:07
 W 5:5:34 1123124 1124124
 Massage 5:10 E: 5:11
 F 6:04 Vinger has expanded in side marked areas

Dry shirt chemical does not leave marked area
 E 6:28 If it does only a lit bit
 End 5:21

- air bubble
- strong smell of vinger
- Vinger and oil make a oily vinger smell substance
- fibers of shirt are laying down

Time captured.

Oil absorbency
 Time 24 Date.

Time END 6:04

massas Time 5:02
 E 5:02
 Wash time 5:34
 dry time 5:11

Measurement:
 Before L 325 W 2219 L 35 W
 After 27 W

51T 5:02 E 5:12
 oil absorbency

Time Date EXD

Massage time 5:54 E
 Wash time 5:34 E 6:04

dry time 5:11 E
 measurements 5:11 E
 Before: After
 L 30.9 W 19.5 L 35.0 W 27

51T time 5:15:08 E 5:17

oil absorbency.
 Time Date:
 Time E

measure net.
 Before. After.
 L 31 W 19.5 L 38 W 25

Source of error min delay for washing

Shift 2 5:06 5:19

5:08 Nov 22 - circle like brush strokes

W 22.5cm
 B
 crystals looking in some areas

L 31cm
 AL 37
 W 26.2
 Wash started 5:38 6:09
 for 59 mins

Quantitative what you see measured.

5:11 5:16
 - Nov 22 B 5:16

W 24.7
 L: 31.5cm 5:38
 wash 5

A
 L 36 W 26
 - some of the finer crystals have dissolved into the shift
 - you can see brush strokes of tooth brush
 - borax appears to have a damp appearance still powdery though
 - borax is very powder and sell like when rubbed between your fingers

Extra notes: 5:19
 5:05 Nov 22 - borax 5:07 pm - 5:08 pm

W 14.5cm wash 3:38 - 30 sec
 L 27cm
 A
 L 38 W 24.6
 - can see brush strokes from tooth brush
 - looks like some of the crystals have been observed

Nov 22, 2011
 Time or putured oil observation

massage time

sit

wash time

dryer time 6:09

- 20 mins

E 6:29

measurements

Acetone Nov 20, 24 Test 93 Time: 6:03 END 6:48

Time returned
oil absorbency 4:10:41

Qualitative observations
- oil is spreading in a horizontal oval shape
- bubble form on the surface of the shirt

massage time 6:17
sit 6:17

- oil makes fibers on shirt more visible and stand up

wash time 8:14
dryer time 8:14

- immediately after Sharpie line was drawn oil started moving past the line.

- Once acetone was poured ceased Sharpie to bleed

Due to Anils

- acetone has started melting T60Z cup

measurements

- at the six min mark 2.5 cm past the line
vanitive what you see measured.
hue to further research acetone can
not be placed in a washing machine
since it can mess up the mechanisms

the wash
L 21 cm
WR 19 cm
oil expand
color bleed
W17.5 L28

notes: with wise it has moved 7 minutes

Step 1 put black garbage bag down
secure with duct tape

Step 2 measure 15 ml of oil
place shirt on garbage bag

Step 3 place shirt on shirt and let
sit for 2 hrs

Step 4 pour oil on shirt and let
sit for 2 hrs

Step 5 after 2 hrs take black sharpie
and mark oil stain then measure diameter

Step 6 pour dish soap on stain
and massage

Step 7 after massaging let dish soap
sit on shirt in the washer machine

Step 8 put shirt in temp high min select time
soil normal silt in digger

Step 9 pat high temp repeat for 5 after digger
no repeat compare for sizes

Step 10 repeat for test sizes
has finished and it repeat for vingers bleach

Step 11 repeat and it repeat for vingers bleach
for dish soap and borax

Step 12 repeat and it repeat for vingers bleach
for rubbing alcohol and borax

Step 1 put black garbage bag down
secure with duct tape

Step 2 measure 15 ml of oil

Step 3 place shirt on garbage bag

Step 4 pour oil on shirt and let
sit for 24 hrs

Step 5 after 24 hrs take black sharpie
and mark oil stain then measure diameter
take pictures

Step 6 pour dish soap on stain massage
for 30 min

Step 7 after massaging let dish soap
sit on shirt for 10 min

8 put shirt in the washer machine
select temp high, warm, spin high
soil normal time 59 min

Step 9 put shirt in dryer select time
20 temp high

Step 10 repeat step 5 after dryer
has finished and compare sizes

Step 11 record if repeat for test 2 & 3
for dish soap and 1-3 for vinegar, bleach,
rubbing alcohol and borax

BORAX

Start time 11:00 am

End time 1:36 washer completed

10:00

Nov 17, 2021

1 - AS shirt absorbs more oil specific areas of oil lighten

estimated time twelve min absorbing

- Sharpie has bleed due to oil

- log digester stain for oil card board stain length 14.5 cm with 19 cm

with 19 cm length 16 cm

- borax did not mix with oil fully might need more time

after 30 seconds

washer time 1:44

- Sharpie discoloration cause looks of rainbow absorbed alot of oil

Source of error -

- borax has gained

did not time how long it took oil to saturate wet back shirt. (borax)

- sharpie bleed larger - 40 ml or

did not start time as in procedure borax

gain ceterogen

not all card board

- sharpie bleed colors red yellow green blue is mix

14 - borax is absorbing oil

is moving away from the line

- borax feel like wet sugar

- fibers of shirt are staining

sharpie stain is 2 cm out from original oil stain

Qualitative Observations

Time: 12:38

END 2:44

- oil shirt absorbed shirt immediately
- you are able to see card board underneath
- fiber of shirt are standing up
- oil is expanding vertically
- oil travel quickly
- card board underneath as soon as through the shirt allowing oil to travel further

Quantitative observation what you observe in measure.

- Sharpie stain is 1cm out from oil stain and was not removed

Nov 17, 2019
Times captured:

oil absorbance
7:45:13

message start
time 12:40 - end
12:41

sit time start
12:41
sharp

measurements

with before
23.5 cm
16.5 cm length before
card board
with 21 cm
length
14.5

- borax amplifies sharpie bleeding
- sharpie bleeding colors are more natural / dark like a steenhouse hold hitting oil stains smells
- oil is absorbing borax
- areas were sharper bleed is more intense color

there is no sharpie bleeding areas in which the is alot of borax
- sharpie lines are still solid

washer started at 1:12 end 2:33
dyer started 2:33
end 2:44

- bubble have began to form on the surface of the shirt
- oil stain is expanding horizontally
- oil has spread in an oval like shape
- few air bubbles have appeared under the shirt surface
- more brown has appeared and less purple
- oil stains are highly visible

Quantitative what you see measured.

- oil stain is less out from original stain
- rubbing is less out from original stain

Extra notes

- oil is string on top of card board
- on card board you can see where oil spread to
- have become more rainbow like red, yellow, blue
- visible ring of sharpie bleed.

Time captured Nov 17, 2011

oil absorbency 7:42.46

massage time. start 5:00
 Legend
 sit start 5:03 sitting
 wash time 5:35 sitting
 dryer time 6:15 sitting
 start 6:47 end
 end 7:06

measurements

length 18cm
 with 24.5
 card board
 29cm with
 length 19.

1 rubbing alcohol qualitative observations 11:03 11:03 pm END 8:54

- oil is desiring in a circular pattern
- many bubbles on the surface of the shirt
- air bubbles were creases of cardboard is

- it appears expand pass the marked line

- rubbing alcohol does not affect the line of where the oil has spread under the marked area

- inside the original stain some parts are white others are not
quantitative what you see measured.

- rubbing alcohol bleed is 6 cm away from the original stain

- oil expanded to three cm past original line

extra notes:

- oil is sitting on top of cardboard

- bubbles on cardboard

- from original line rubbing alcohol is drying on cardboard

- took like cardboard look like wet paper

- with eight min remaining house have become more elastic
- in sc

Nov 17 24

Time of purchase
oil absorbing 11:12:10

6:51
massage time

sit start 6:52
end 8:58
wash time start
7:28 end 8:12
dryer time
end 8:54 pm

measurements

pre wash

length 13.5 cm

with 16.5 cm

cardboard

20 cm length
with 18.5

- Oil is describing in an oval like shape
- Oil look bubbly on surface of the shirt
- if pressure is applied moves quicker
- the area of shirt has contact with cardboard makes area purple
- rubbing alcohol caused sharpie line to turn
- oil sits on top of cardboard

quantitative what you see measured

Oil expanded 21 cm in width and in length expanded 14.5 cm
 the bleed expanded 2:5 for the original mark 1:1

notes:

- bubble from the surface of the shirt are bubble from the cardboard
- sharpie bleed is till highly visible
- oil has clothes to expand after original sitting
- in some areas rubbing alcohol cause the sharpie to bleed in others oil cause the sharpie to bleed
- rubbing alcohol color bleed from sharpie dark purple and dark purple

Time as performed
 oil observation 7:50.11

massage time start 3:40
 end 3:42
 sit start 3:42 end 4:12
 wash time start 4:13 end 5:20
 dryer time 5:45 start
 end 5:45

measurements

with 23.5
 length 13.5
 cardboard
 length 19.5
 with 26.5

NOV 20, 20
Time captured
oil absorbancy 4: 56-54
1:33

START 11:45

Time: 9:29

Test: 3

Vinegar
QUALITATIVE OBSERVATIONS

- Oil deposed in a lemon like shape
- Oil has taken on rectangle or cardboard
- air bubbles developed in the crease of the shirt
- bubbles are on the tips of the fibers
- immediately after line was drawn oil started to expand past original line.
- when on card vinger oil bubbles
- when measurement were being oil bubble clung to the ruler
- in some areas of the material feel wet to the touch - what you see measured.

message time 9:39

sit 9:40

wash time 10:14 end

dryer time 11:24

S 11:25

E 11:45

measurements

pre wash

L: 14.4 cm

w: 3.2 cm

oil expansion

L 19 cm

w 2.2 cm

card board

L 22.5 cm

w 23.3 cm

after wash

L: 23.5 cm

w: 23.3 cm

notes:

- but look dry
- vinger dose not seem to be causing sharpie bleeding
- after 30 min time expanded 2 cm on the bottom on the sides 1 cm

Vinegarone
qualitative observations

Test 1 Time: 8:08

END 10:22

NOV 20, 24

- oils desprcing in a destorted circular shape
- oil bubbles are forming ⁱⁿ under crease of card board
- ~~test~~ shirt is absorbing oil quickly

Visible traces of oil in vinegar white.
 massaging - on card board oil stain kept it's original size and vinger bleed out
 - vinger does not cause bleeding to sharpie
 time
 - oil does not dry oil does

quantitative what you see measured: drier wash

sharpie drier changed color to blue same result as test on

measurements

pre wash
 L 13 cm
 W 18 cm

oil expansion
 L 20.5 cm
 W 16.5 cm
 card board
 L 15 cm W 20.5 cm

notes:

- film on shirt gives the illuse in part of shirt is drying
- ~~at~~ on the left their is no sign of sharpie bleeding
- it appears that the vinger and the oil a reacting
- just like the dish soap
- at the 15 min mark the oil had expanded 1.5 cm at the bottom and the top 1.7 cm

Time captured

oil absorbant 4:54.02
 massage time 8:15
 sit 8:18 end 8:48
 wash time start 8:52 end 10:02pm
 dryer time 10:02pm end 10:22

after wash

Vinager Test 1 Time: 6:56 END 9:05

Qualitative observations

- oil is desprcing in a circle like shape
- oil produces ring bubbles on the tip of the fiber
- bubble look circular
- air bubbles in crease of card board
- imedatly after Sharpie line was drawn oil continued to expand out ward from the sharpie out line
- un like other chemical vinager did not desprce as fast
- vinager did not cause bleeding to sharpie

Quantitative what you see measured.

Time as performed
oil absorption 4:52.48

massage time 7:01 - 9

sit 7:00 2 7:30

wash time 7:40 card

dryer time 8:51

stop 8:51

end 9:05

measurements

pre wash

L 18.2 cm

w 10 cm

oil expansion

L 22 cm

w 19 cm

card board

L 17.9

w 19.5

notes:

- what appears that the vinager is sitting on top of the oil
- on card board oil is sitting on top
- in the middle of the oil stain there is a film
- at the 12 min mark the oil line has expanded 2 cm from the bottom and 5 mm from the top

Pawn dish soap 10:13 Time: 10:15 END 12:39
Qualitative observations

- oil is desprecing in an oval like shape
- tiny bubbles are on the surface of the shirt
- air bubble are forming
- oil has caused fibers on shirt to stand up
- slowly oil is starting to move past sharpie line
- on cardboard smells like soap feel like oil
- film that was noticed in previous test is starting to form

Quantitative what you see measured.

Nov 8, 2004
Time observed

oil absorption 5:48.36
massage time 10:29 pm
sit 10:30 pm
wash time 11:03
dryer time 12:12
12:18 am
END 12:39

measurements

L 14.8 cm
W 18.2 cm
oil ex point L 18
W 17.5
card board L 14.5 cm
W 11.5 cm

Notes:

- most of the suds have been absorbed into the shirt
the oil has made
- at the ten min mark 11 cm away from the original sharpie line
- soap stuck to card board colon

- Qualitative observation tests
- Oil is spreading significantly faster than test 2
 - Oil has dispersed in a circle like shape
 - cold board underneath is ragh
 - oil is still spreading causing sharpie to bleed
 - massaging borax in shirt help oil absorb better
 - sharpie bleed is lighter compared to others

Quantitative: what you see measured.

Time: 1:19
End: 3:58
Nov 24
Time: 1:24
caption:

oil adsorbent
5:13:6

massage 1:55
sit 30 min - 2:25

wash time 2:27
- end 3:37
dryer 3:39

measurements

- before wash length 16 cm
- with 16.5 cm
- card body
- with 16.5
- length 15.5

- borax 3 has no oil stain or sharpie bleeding stains
- Final observation all 3 test show borax removes oil stain as long as they immediately

washer stall

2:27

Borax - 30 min
1:55 pm
sit 30 min
2:25 pm

1/5

- Oil is despring in a hot like shape

- oil casee fibers to stand up

- air bubble begin to form under skin

- tooth brush movements look circles

- areas of cold board have a film created from the oil and soap

- in areas were the oil has seeped past the sharpie line the dye

- in some areas it look like the soap is drying

oantive what you see measured.

- at 3 min mark oil speed past the sharpie line

3cm

notes:

- over the last 30min expanded oil has gotten bigger and the sharpie line has gotten thinner

- in middle of the stain there is a film type of substance making some areas look dry or pasty

- even after sitting for long amount of time still covered in film

Time of picture oil absorption 11:40:13

massage time 9:11

sit 9:12 end 9:14:3

dash time 9:55 end 11:10

dryer time: 11:01 end 11:22.

measurements

pre wash

L: 14.5 cm

w: 18.5 cm

expanded oil

L: 21.5 cm

L: 20 cm board

L: 25 cm

w: 18.5 cm

Qualitative observations

Nov 19, 2021

- Oil degreasing in a circle like pattern
- bubbles on the surface of the shirt
- Small air bubbles are appearing in the crack of the cardboard
- Oil makes fibers stand up
- Once massaging started bubbles formed
- on cardboard soap suds sit on top of oil
- at 3 min mark the oil has seeped past 2cm

Quantitative observations

you see measured

Time as pictured
oil absorbing 4:47.28

massage time 7:42 pm

Sit 7:48 pm

Wash time started 8:20

Dryer time. End 9:31

start 9:31 pm

measurements

pre wash

length 18.5 cm

with 18 cm

expanded oil

L 22.5 cm 2.5 cm

card board

with 22.5 cm

length + 18.5

notes:

unlike other test like rubbing alcohol dish soap removed expanded oil marks