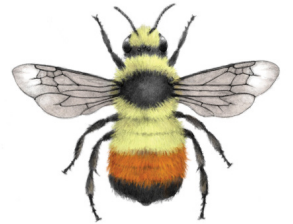




MY FIELD GUIDE TO B E E S



NAME: _____



CHOOSE YOUR OWN ADVENTURE!

This is YOUR book. Do the activities that sound fun and skip the ones that don't.

Go outside!
Look for
bees.



Page 5
HOW TO
IDENTIFY BEES



Page 15
BEE A SCIENTIST
Experiments



Page 21
FUN



Page 29
JOURNAL



Page 49
HOW TO
HELP BEES



CHALLENGE

There are 10 larvae hidden in this field guide. Can you find them?

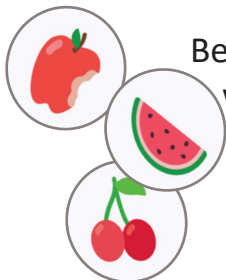
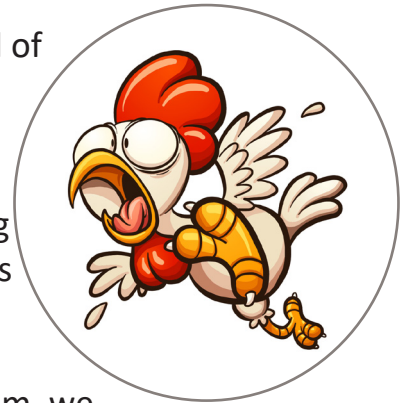


HELLO YOUNG SCIENTIST!

You are about to go on a great adventure!

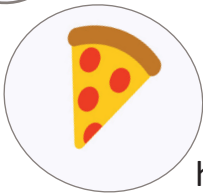
Bees are EVERYWHERE, but most people don't notice them.

When people DO notice bees, they are often terrified of them. Do you feel scared when you see a bee? If so, you are not alone. Feeling scared is okay, because it gives us the chance to feel brave. We hope you will feel brave enough to learn more about bees. Learning about bees makes us feel less afraid and more curious about watching them.



Bees are very important little creatures. Without them, we wouldn't have many delicious fruits and vegetables.

For example, if you like watermelon, blueberries, kiwi, peaches, pears, cherries, and plums...thank a bee!



If you like pizza, you should DEFINITELY thank a bee!
Tomatoes are pollinated by bumble bees. The cows that make cheese eat alfalfa, which is pollinated by leaf-cutter and honey bees!

Now...go outside and explore. Once you start "seeing" bees, your life will never be the same. Every walk will be like a treasure hunt, and your friends will think you are the bravest person they've ever met!

Sincerely,

Environmental Education
Portland Parks & Recreation City Nature

MY CHECKLIST

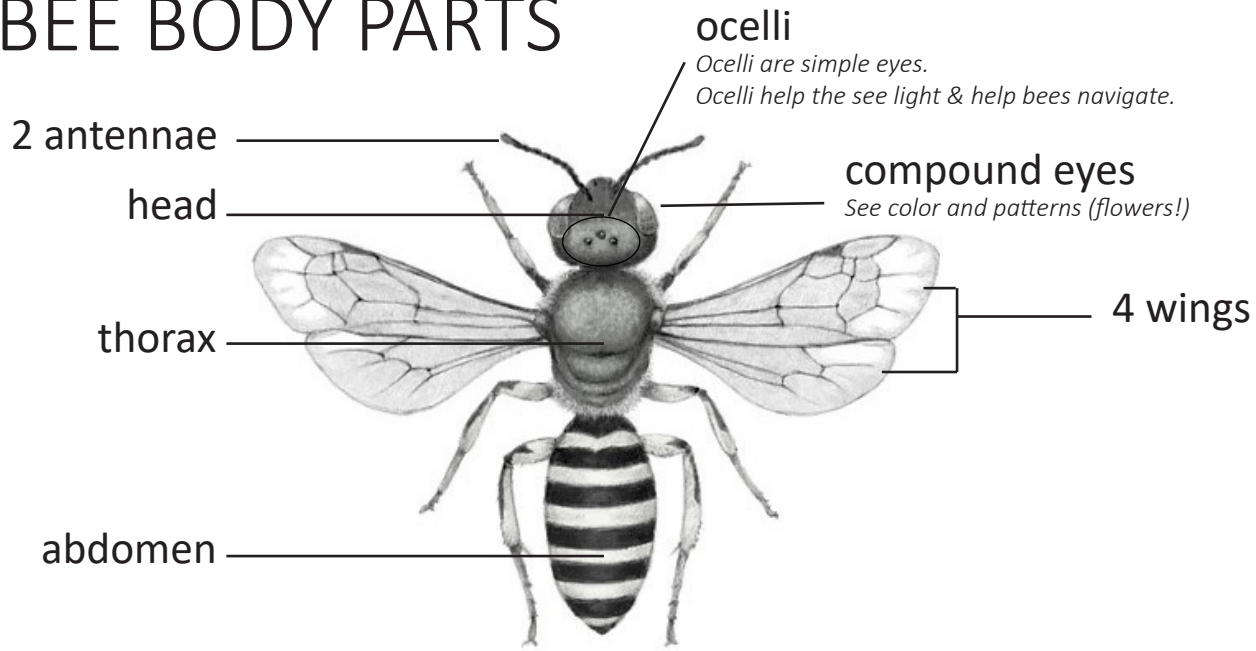
TREASURE HUNT! How many bee species will YOU find!

	Type of Bee	When I saw it for the first time	Where was it and what was it doing?
<input checked="" type="checkbox"/>	Example Bee	May 2, 2020	It was sipping nectar from a yellow flower at my Dad's house.
<input type="checkbox"/>	Cuckoo Bee		
<input type="checkbox"/>	European Honey Bee		
<input type="checkbox"/>	Green Sweat Bee		
<input type="checkbox"/>	Leafcutter Bee		
<input type="checkbox"/>	Long-Horned Bee		
<input type="checkbox"/>	Mason Bee		
<input type="checkbox"/>	Small Carpenter Bee		
<input type="checkbox"/>	Sweat Bee		
<input type="checkbox"/>	Tickle Bee		
<input type="checkbox"/>	Bumble Bee, Black-tailed		
<input type="checkbox"/>	Bumble Bee, California		
<input type="checkbox"/>	Bumble Bee, Mixed		
<input type="checkbox"/>	Bumble Bee, Western		
<input type="checkbox"/>	Bumble Bee, Yellow-faced		

HOW TO IDENTIFY B E E S

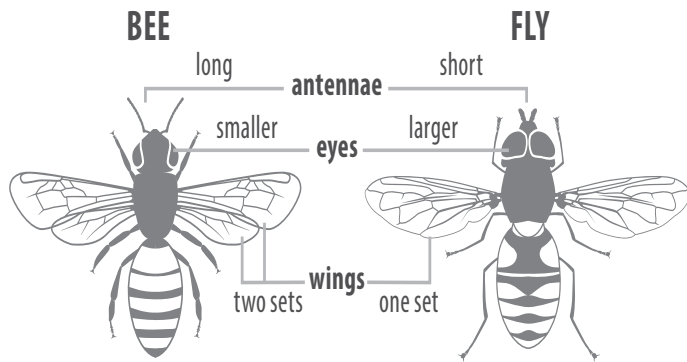


BEE BODY PARTS



LOOK ALIKES!

Don't be fooled! Some flies disguise themselves as bees so that other animals won't try to eat them.



WASP

Many people mistake WASPS for bees. How can you tell them apart?

Wasps want your food.
Bees do not!



Bees only want pollen and nectar.

Wasps have tiny waists.



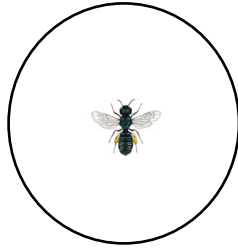
This is a harmless FLY disguised as a WASP!

This is a bee. It has pollen on its legs.

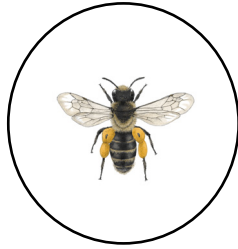
Is this a fly or a bee? _____

CLUES! TO HELP YOU IDENTIFY A BEE

1. How big is it?



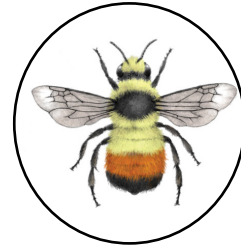
SMALL



MEDIUM



LARGE



EXTRA LARGE

2. Is it hairy?



ALL OVER



HAIRY BELLY
(ABDOMEN)



ON LEGS



HEAD & THORAX

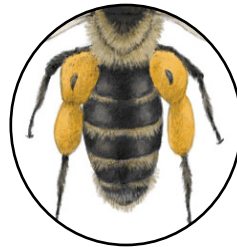


NO HAIR

3. Where does it carry pollen?



OUTSIDE OF HIND LEG



UPPER LEGS



HAIRY BELLY

4. What do its antennae look like?



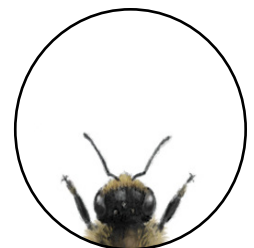
LONG



SHORT



THICK



THIN

FINDING BEES



SUN

Look for bees on sunny days! Bees are most active when they can sip nectar and be warm.



FLOWERS

Look in the center of flowers for bees.



SOME ARE TINY

Many people don't see tiny bees like cuckoo bees and sweat bees. If you see a dark dot in the middle of a flower, get down close to look at it!



HOLES IN THE GROUND

If you notice a bunch of holes in the grass or in a patch of dirt, look closely. You might see ground-nesting bees coming out.



Look low!



Look high!

BEE SAFE!

BEES ARE BUSY

When bees are drinking nectar from flowers, they are too busy to notice you. That is the best time to get close and look at them. Move slowly and be calm.

AVOID NESTS

If you see many bees coming out of one hole, watch out! Social bees (honey bees and bumble bees) will protect their nests. Stay away from bee and wasp nests.

HOW NOT TO FREAK OUT

If you are really, really scared, that's okay! Take your time. Watch from far away first, and then move closer and closer when you feel more comfortable. Get a little closer every day.

SOME PEOPLE ARE ALLERGIC

Ask a parent or guardian if you are allergic to bee stings. If you are, you should be extra careful, and stay with a parent or guardian.



There are 3,600 types of bees in the United States. These are the

14 MOST COMMON BEES

in Portland

Cuckoo Bee

Genus: *Nomada*



Female cuckoo bees do not make their own nests. They lay their eggs in the nests of other bees. Cuckoo bee larvae eat the eggs and larvae of other bees. You can see cuckoo bees flying above the ground looking for bee nests.

Look for:

- Abdomen: black, red or yellow
- Antennae: thick
- Size: small or very small

European Honey Bee

Genus: *Apis mellifera*



Honey bees are the only species that make honey we eat. They live in large colonies, with many worker bees. Younger bees take care of larvae, older bees guard the nest entrance, and the oldest bees look for flowers and nectar.

Look for:

- Abdomen: striped and smooth
- Hair: on the thorax
- Pollen: on the “knees”
- Size: medium or large bee

Green Sweat Bee

Genus: *Agapostemon*



These bees visit a lot of different kinds of flowers. They have a short tongue, making it hard to get nectar from deep flowers. Females are fast fliers!

Look for:

- Abdomen: black and yellow
- Green head and thorax
- Size: small bee
- Pollen: on hind legs

Leafcutter Bee

Genus: *Megachile*



These bees cut pieces of leaves and flower petals to use as walls in their nests. Females have special large jaws to help with the cutting!

Look for:

- Color: smoky gray
- Shape: wide body and head
- Pollen: on hairy belly (females only)
- Size: large

Long-Horned Bee

Genus: *Melissodes*



These are important pollinators of sunflowers! Males will often sleep in groups in the middle of the sunflower!

Look for:

- Antennae: very long antennae (males)
- Hair: on thorax, and very hairy legs
- Pollen: hairy legs on females, and all over body
- You can see them mid-summer through fall

Mason Bee

Genus: *Osmia*



Mason bees are very important pollinators of fruits and vegetables! For this reason, many people want these bees near their homes and farms.

Look for:

- Color: many are metallic green, blue or purple
- Shape: round head, round, wide abdomen
- Pollen: on hairy belly (abdomen)

Small Carpenter Bee

Genus: *Ceratina*



Carpenter bees build special rooms for their babies inside of hollow plant stems. Each egg gets its own room. The mama gives each egg a big ball of pollen to eat when it hatches.

Look for:

- Color: looks black from far away; up close metallic green
- Abdomen: special cylindrical shape
- Face: may have yellow or white marks on face
- Size: small or very small

Sweat Bee

Genus: *Halictus*



Some sweat bees like the salty taste of human sweat. Sweat bees are important pollinators of sunflowers and watermelons.

Look for:

- Color: dark with striped abdomen
- Pollen: on legs
- Size: very small to medium



Tickle Bee

Genus: *Andrena*



We call them “tickle bees” because their stingers are not strong enough to sting you. They are also called “mining” bees because they make

tunnels in the ground. Look for bees flying over holes in the ground, from March to May.

Look for:

- Color: dull black or gray, sometimes thorax looks red.
- Hair: hairy thorax
- Pollen: lots of pollen on armpits and legs
- Size: medium to large

Bumble Bees

Genus: *Bombus*

Look for big, round hairy bees! Bumble bees are important pollinators of many fruits and vegetables. Some flowers, like tomato flowers, need to be shaken to release the pollen. Bumble bees grab onto the flower and vibrate their flight muscles. This is called “buzz pollination.”



very rare!

Western Bumble Bee



Black-tailed Bumble Bee
Bombus melanopygus



California Bumble Bee
Bombus californicus



Mixed Bumble Bee
Bombus mixtus



Yellow-faced Bumble Bee
Bombus vosnesenskii

BEE LIFE CYCLE

MOST BEES LIVE ALONE and make nests in holes in the ground, or inside of hollow sticks.



Photo: Matthew Shepherd, Xerces Society

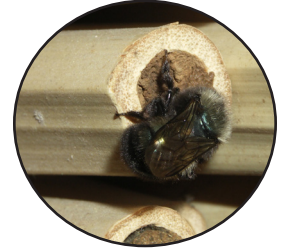


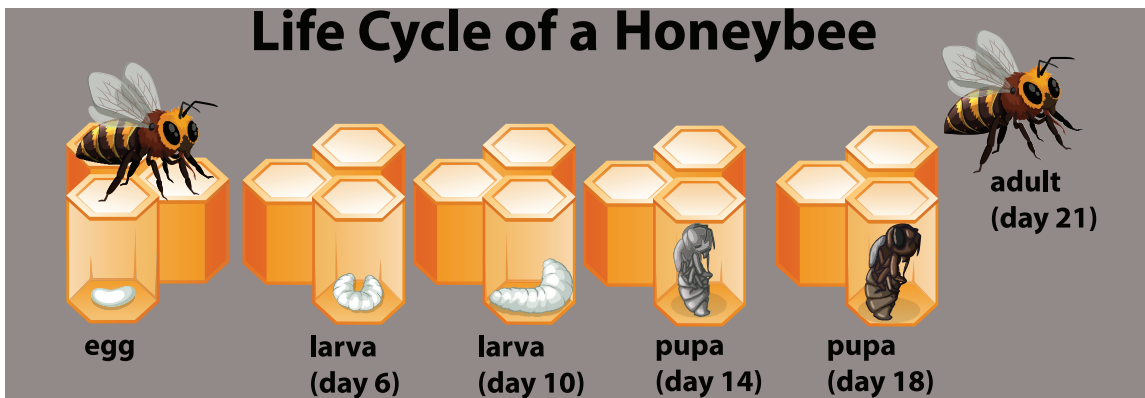
Photo: Mace Vaughan, Xerces Society

HONEY BEES AND BUMBLE BEES ARE SOCIAL. They nest in a hive with lots of other bees. The bees all have different jobs. There is one queen bee, and many worker bees. Most bees you see are females.



All Honey Bee photos by Robert Stanhope

Life Cycle of a Honeybee



HONEY BEE EGGS



LARVAE



PUPA



I'm all grown up! Time to leave my cell.



Photo by Elaine Evans

BUMBLE BEES

Bumble bees live in nests underground. Can you see the big queen bee in this photo? She lays all the eggs. The other bees are worker bees. They are working on "honey pots" where they store honey and raise young.

TICKLE BEE AND THE VERY BAD DAY



This is a great place for my nest!



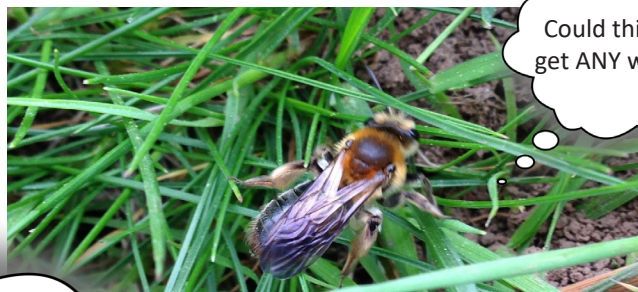
My babies are going to LOVE this delicious pollen when they hatch.



Why are these giant monsters poking around our homes?!?! Too bad I don't have a strong stinger.



Heh, heh, finally that tickle bee has left. Now I can lay my eggs in her nest. She will feed my babies! HA, HA, HA!



Could this day get ANY worse?



CUCKOO BEE

The tiny Cuckoo bee sneaks its eggs into the nests of other bees. Look for a little red insect flying around bee nests.

TICKLE BEES

Tickle bees make their nests in the ground. They fly around from March to May. Their stingers are so weak that they cannot sting you.

A FANCY LITTLE BEE GETS MAD

Psst! Hey kid! Yeah,
YOU!
Look down here.



Closer.....



Closer.....



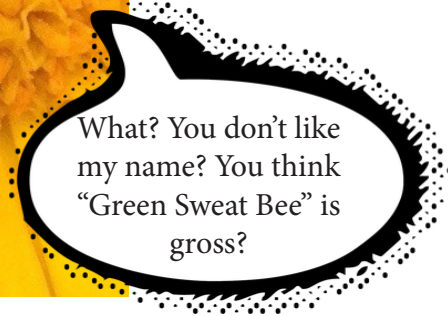
Why are you making
that face?



Yes! Now finally you can
see how beautiful I am...



What? You don't like
my name? You think
"Green Sweat Bee" is
gross?



Maybe I need a new name.
With my yellow and black striped abdomen,
I should be called Leopard bee. And my thorax
is green like a leaf. Yeah, that's good. Call me
Leopard Leaf Bee.



How would YOU rename the
Green Sweat Bee?

BEE A
SCIENTIST



FIND A BEE

Go outside and find a bee. Watch it. Write down what you discover.

Observe it

What is it doing?

Describe it

Colors

- | | | |
|--------------------------------|---------------------------------|---------------------------------|
| <input type="checkbox"/> Black | <input type="checkbox"/> Green | <input type="checkbox"/> Red |
| <input type="checkbox"/> Blue | <input type="checkbox"/> Orange | <input type="checkbox"/> Yellow |
| <input type="checkbox"/> Brown | <input type="checkbox"/> Purple | <input type="checkbox"/> _____ |

Does it carry pollen?

- | | |
|-------------------------------------|---|
| <input type="checkbox"/> Legs | <input type="checkbox"/> Belly |
| <input type="checkbox"/> Upper legs | <input type="checkbox"/> It does not carry pollen |

Size _____

Antennae _____

Hair _____

Draw it

Be Curious

I notice...

I wonder...

What would YOU name this bee?

TRY THIS EXPERIMENT!

QUESTION: *What color flower do bees like the most?*

YOUR BEST GUESS (*hint: go outside and make a guess based on what you see*): _____

HOW TO TEST IT: Go outside on a sunny day. Look closely at flowers and bugs that you see. Everytime you see a bee, write one mark on the data sheet below.

DATA TABLE

Flower color	How many bees I saw on that color flower
Example	<i> </i>
Red	
Yellow	
Orange	
White	
Purple	
Blue	

WHAT DID YOU LEARN? WHAT COLOR FLOWER HAD THE MOST BEE VISITORS? _____

Now you are ready to do your own experiments!!!
What will YOU discover?

MAKE YOUR OWN EXPERIMENT!

MY QUESTION: _____

MY BEST GUESS *(hint: go outside and make a guess based on what you see)*: _____

HOW AM I GOING TO TEST IT? *(Write down the steps)*:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

MY DATA (*draw a table like the one on the other page*)

WHAT DID YOU LEARN?



What does a bee
style her hair
with?

A honeycomb!

Why did Maria's parents scream
when they saw her grades?

Because she had a bee on her report card.

What do you call bears
without ears?

B's

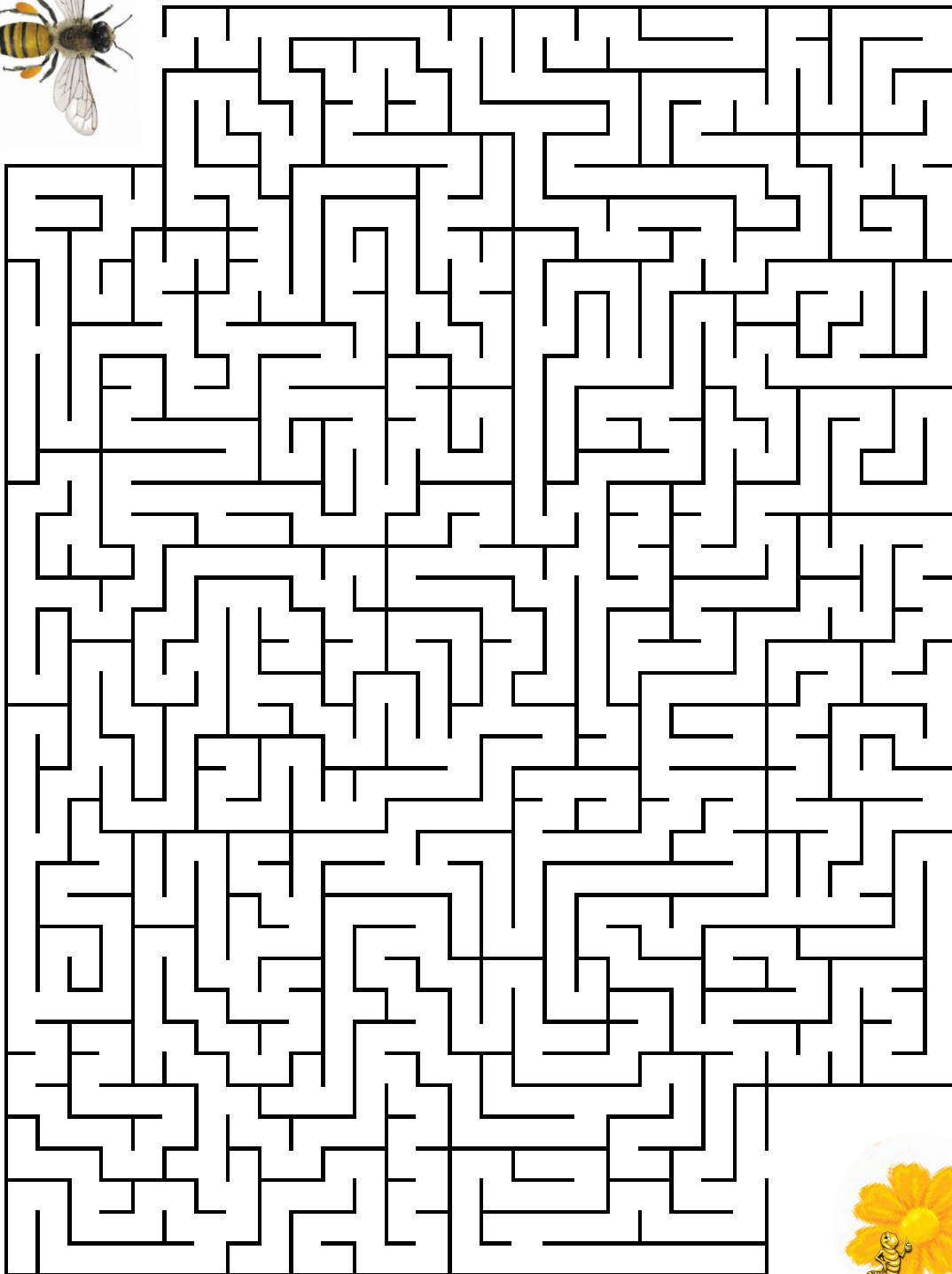
What's more impressive
than a talking llama?

A spelling bee!

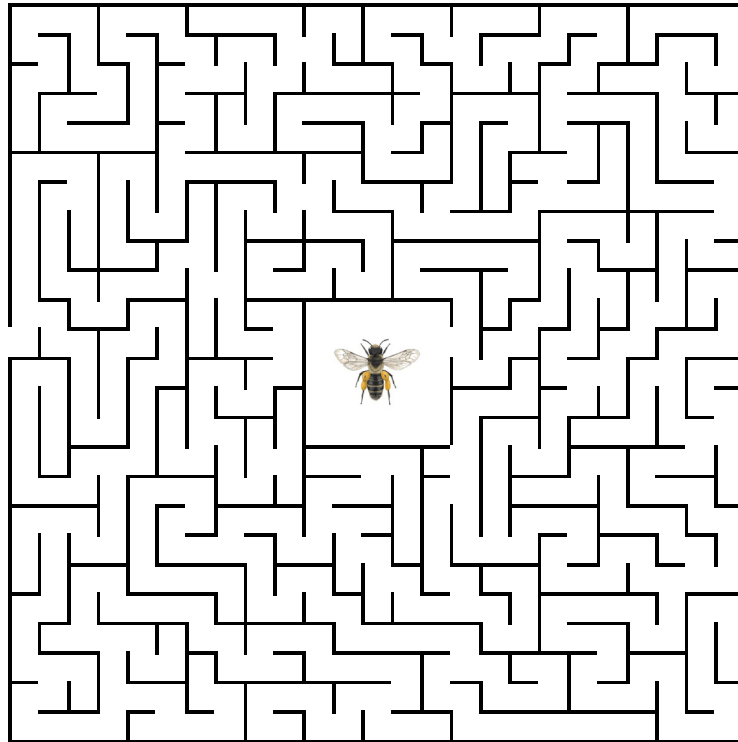
F U N



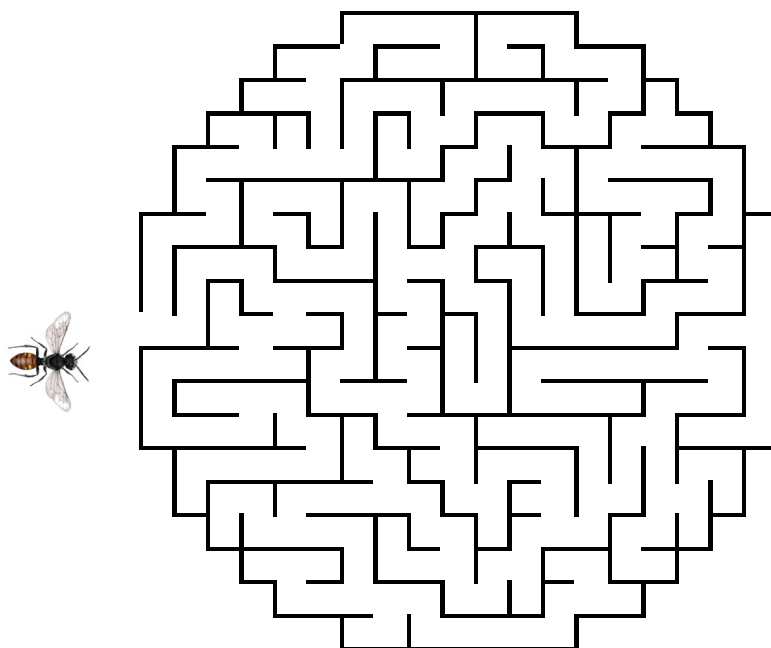
HELP THE HONEY BEE FIND THE YUMMY FLOWER



HELP THE TICKLE BEE GET OUT OF ITS NEST!



HELP THE CUCKOO BEE FIND A DIFFERENT BEE'S NEST TO LAY ITS EGGS IN.



Success!!! I laid my egg in the tickle bee nest. Now the tickle bee will take care of it.

WORD SEARCH

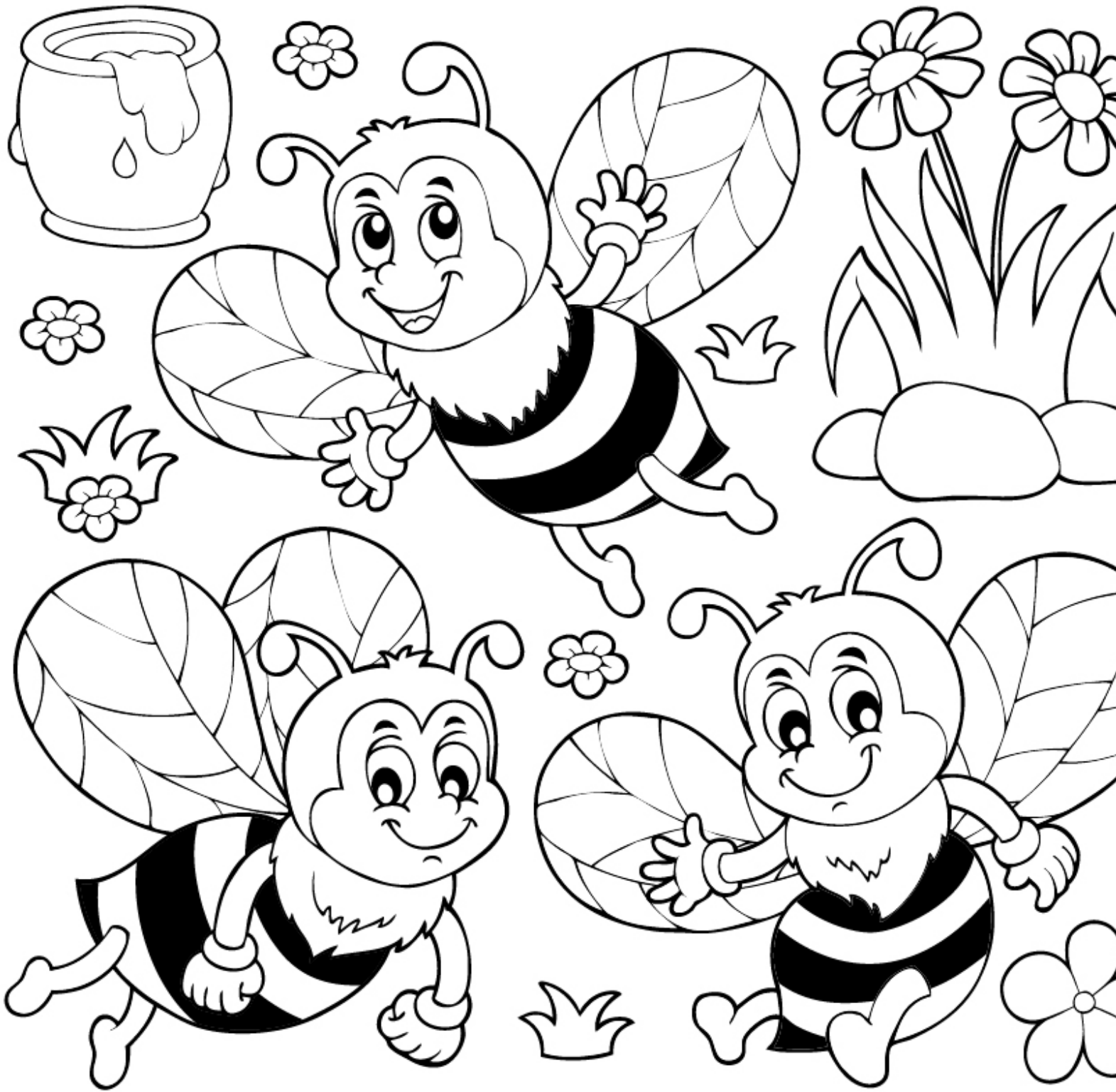
Y F O L N E N C Z W T B J A P
Z F N C R A Y E U H I V E G O
R E I I M V Q P L C U N J P C
Q J Z X I R N E L L K I X O W
G W B A I A R O W E O O K L I
Y E N O H L A D S J G P O L N
L J F G Z L A H I A B N J I G
T I C K L E I A D M M E A N S
S C H R H S N M J Y O E F A N
V G F M G T X H W R L U Q T W
O F H F E A W T S S I Q Q O D
Q V V N R Z E W B U K F F R L
A Y N O S J E K P L G T S T Q
U A H G K A W T N E M O D B A
E T L U T H B H N Q P W D X Z

ABDOMEN
HEAD
THORAX
WINGS
ANTENNAE

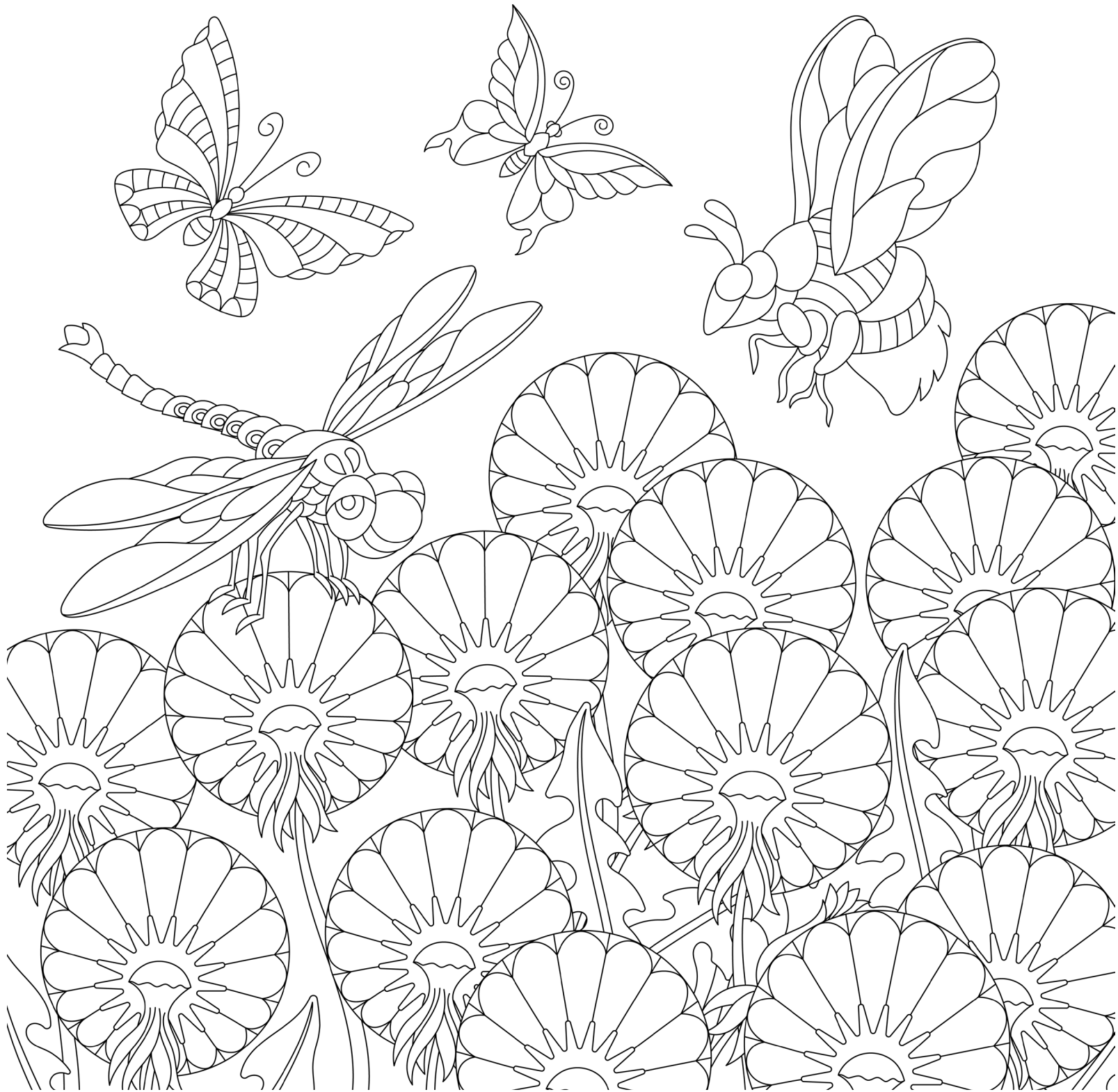
QUEEN
LARVAE
HIVE
HONEY
POLLEN

POLLINATOR
MASON
TICKLE
CUCKOO
SWEAT

COLORING PAGE









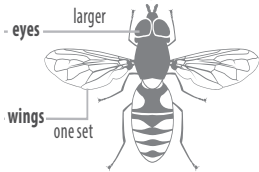


COLORING PAGE



BEE BINGO

Color in each box when you find it.

Can you fill in the whole Bingo card? Can you get 3 in a row?

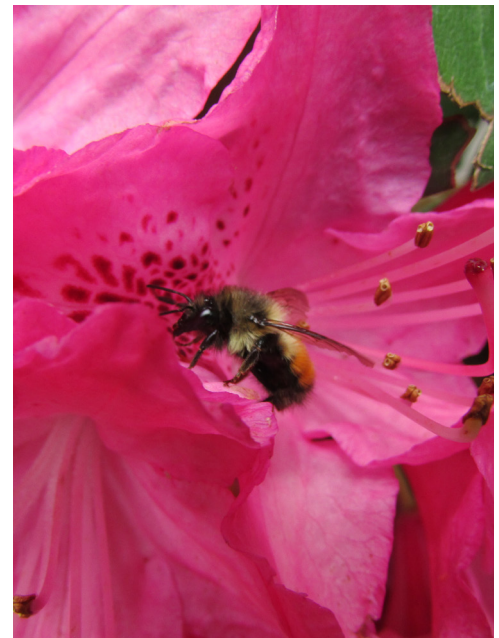
<p>Find a BIG bee</p> 	<p>Find a bee carrying lots of POLLEN</p> 	<p>Find a bee that looks SCARY</p> 
<p>Find a CUTE bee</p> 	<p>Find a bee on a PURPLE flower</p> 	<p>Find a SMALL bee</p> 
<p>Find a FLY that looks like a bee.</p> 	<p>Find a HAIRY bee</p> 	<p>Find a GREEN, PURPLE OR BLUE bee</p> 



Shira, age 9



Zwi, age 8



Aldo, age 9

MY BEE JOURNAL

These are **YOUR** pages. Do **ANYTHING** you want with them.



ART

- Draw bees.
- Make a cartoon about bees.
- Make a collage with pictures of bees & flowers you find in magazines.
- Take photos of bees. Print them out and glue them in the journal.



SCIENCE

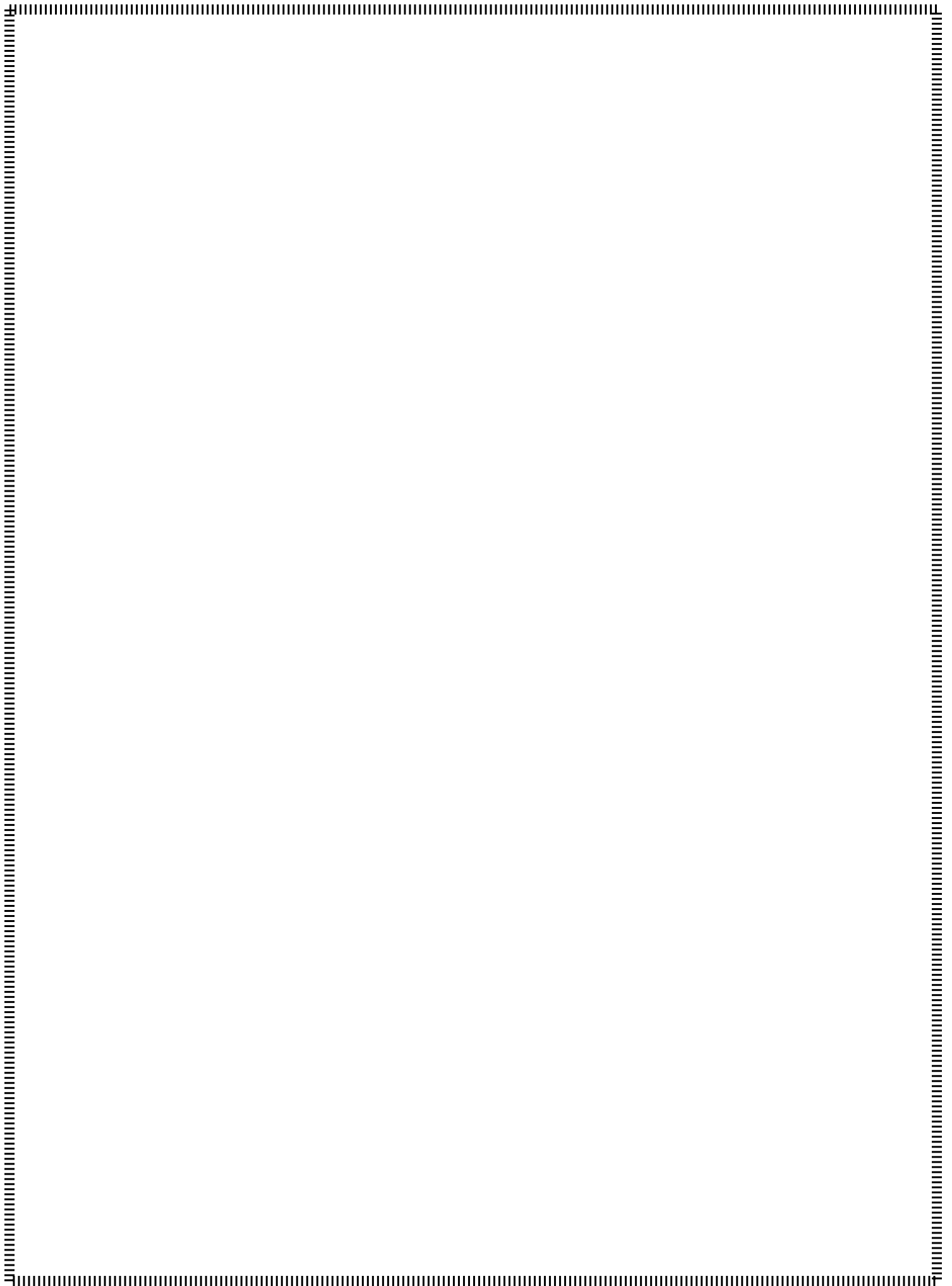
- Take notes about what you see.
- Do experiments and record your data here.

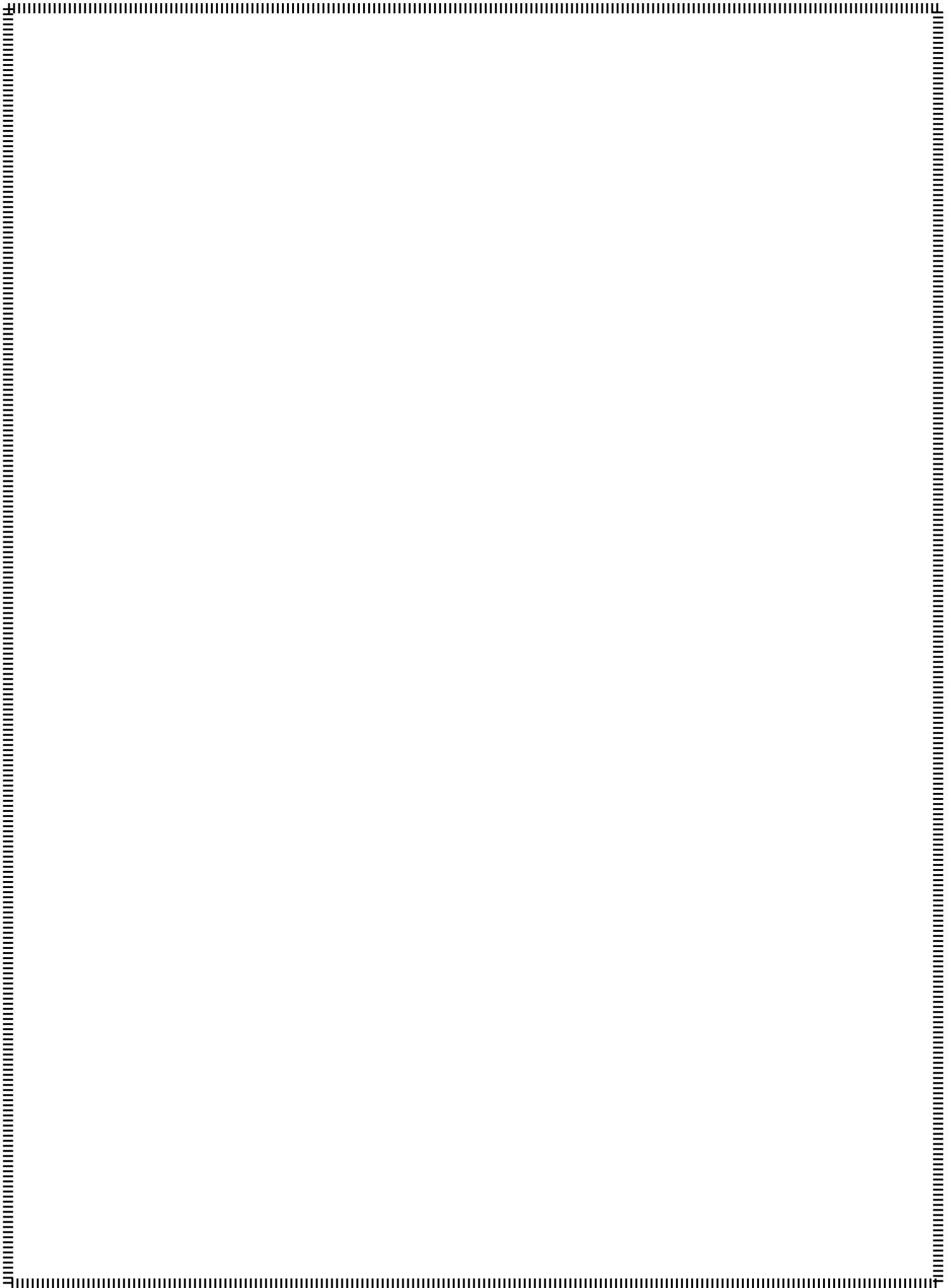


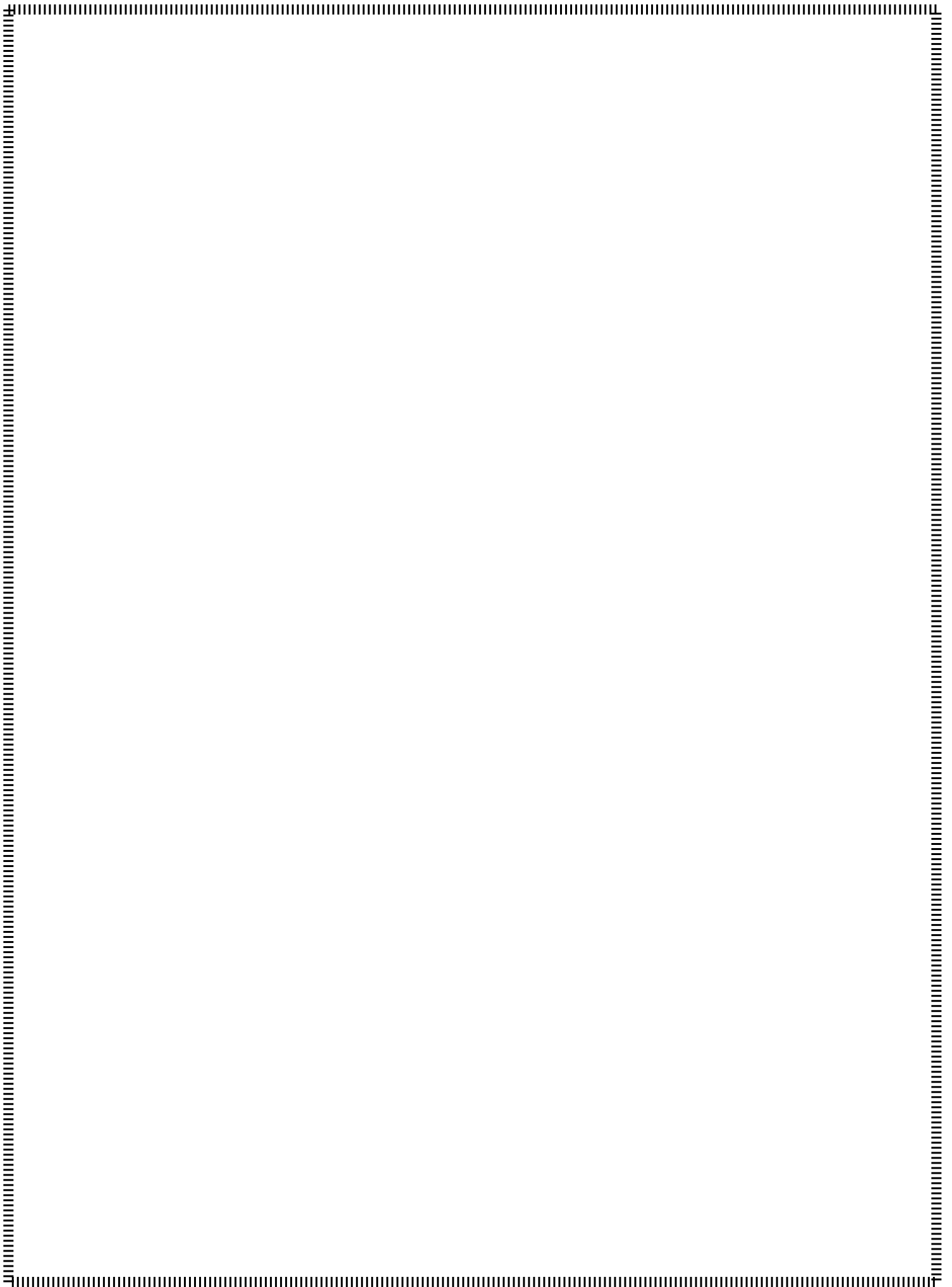
CREATIVE WRITING

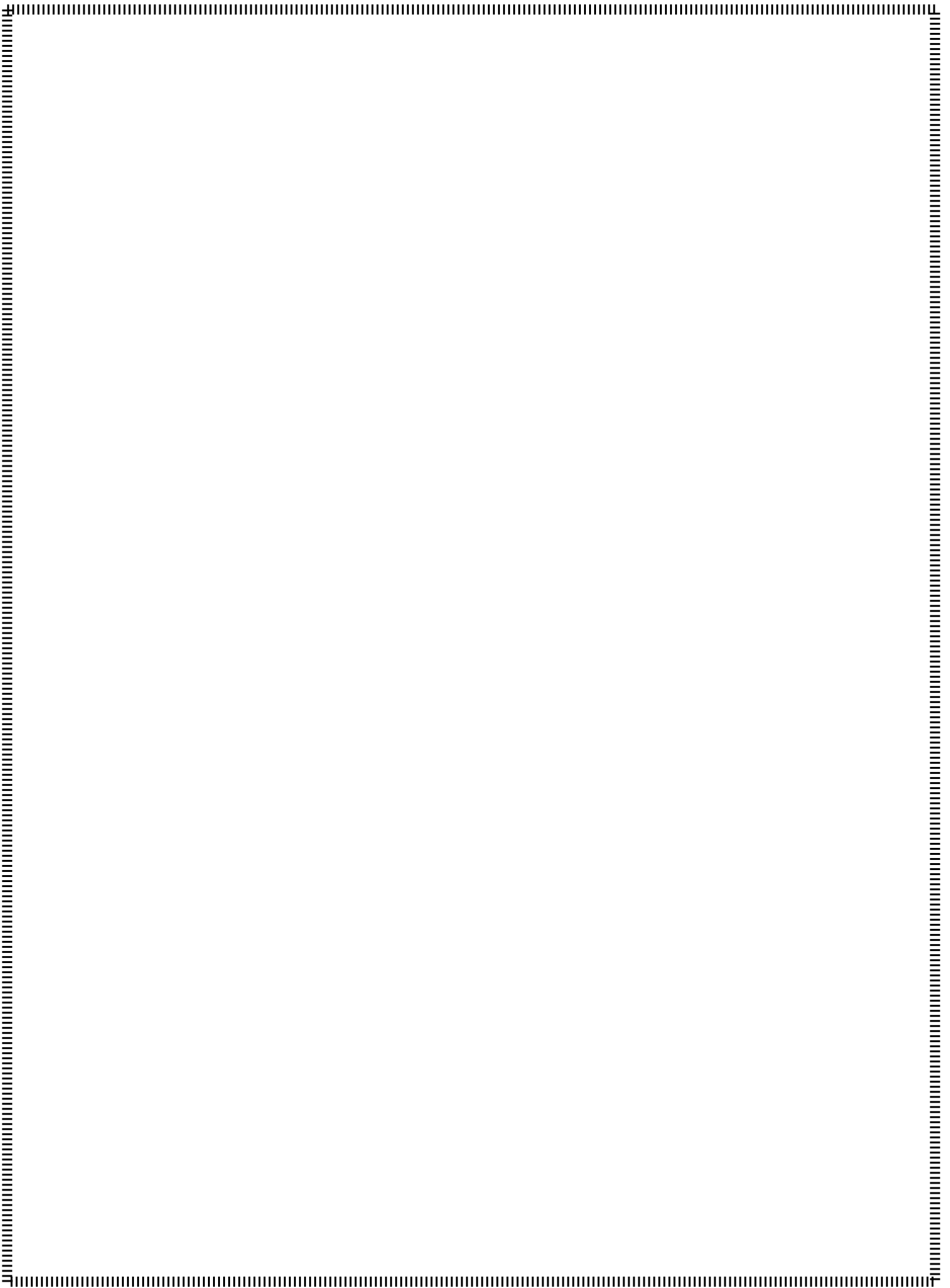
- Write a poem about bees.
- Write a story about bees.

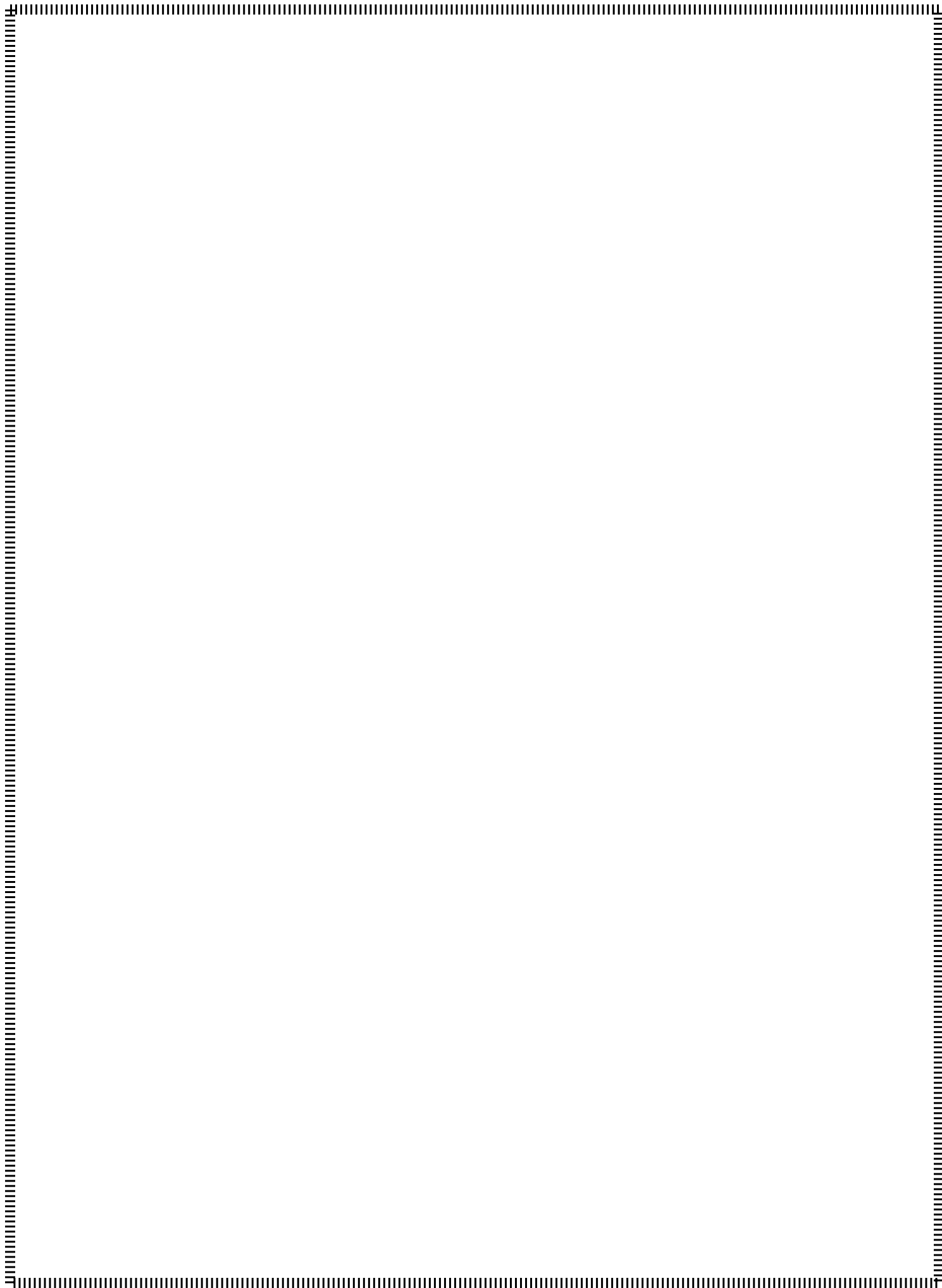
We want to see your work! Please go to our website to submit your work.
www.portlandoregon.gov/parks/ee

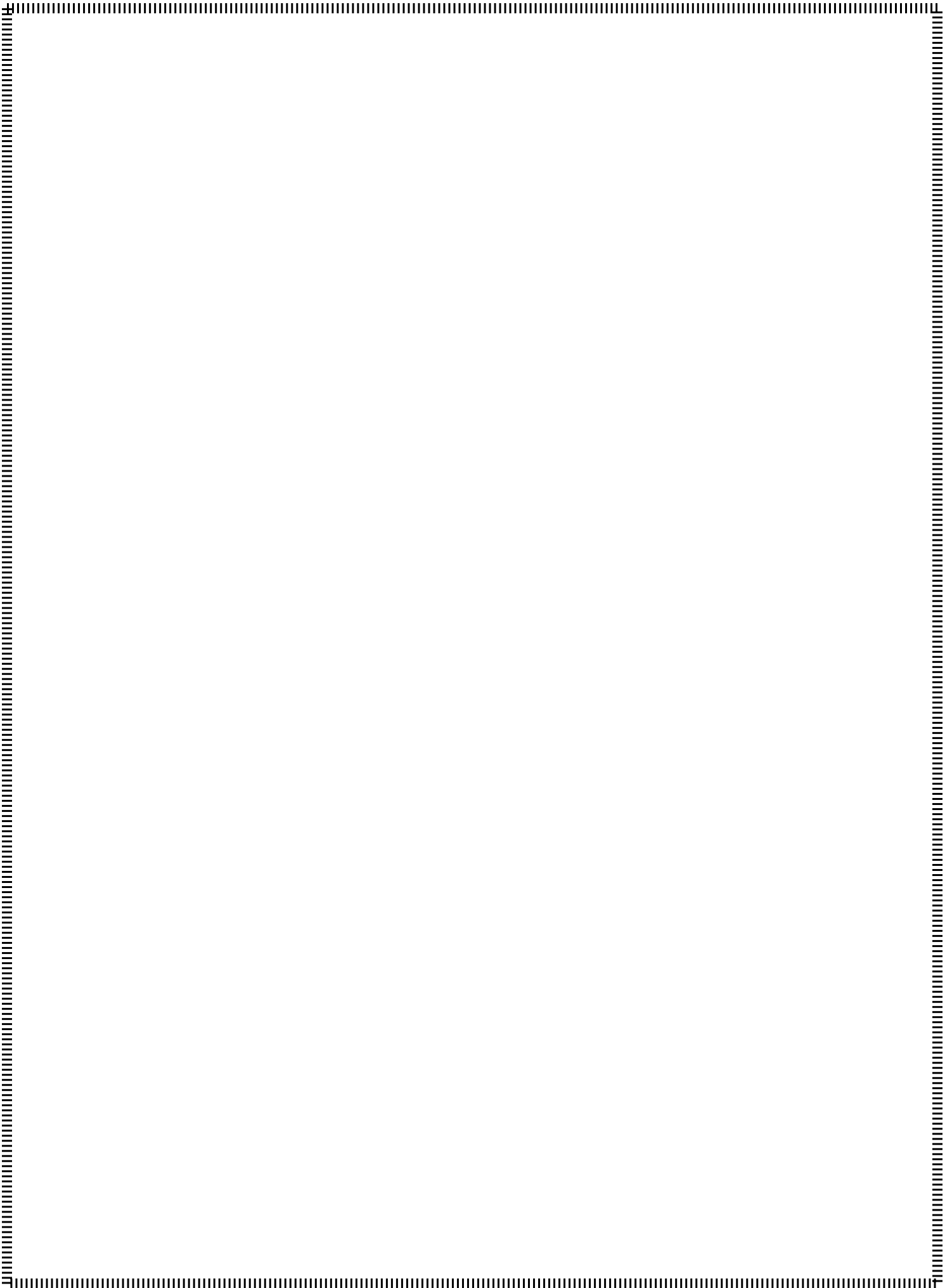




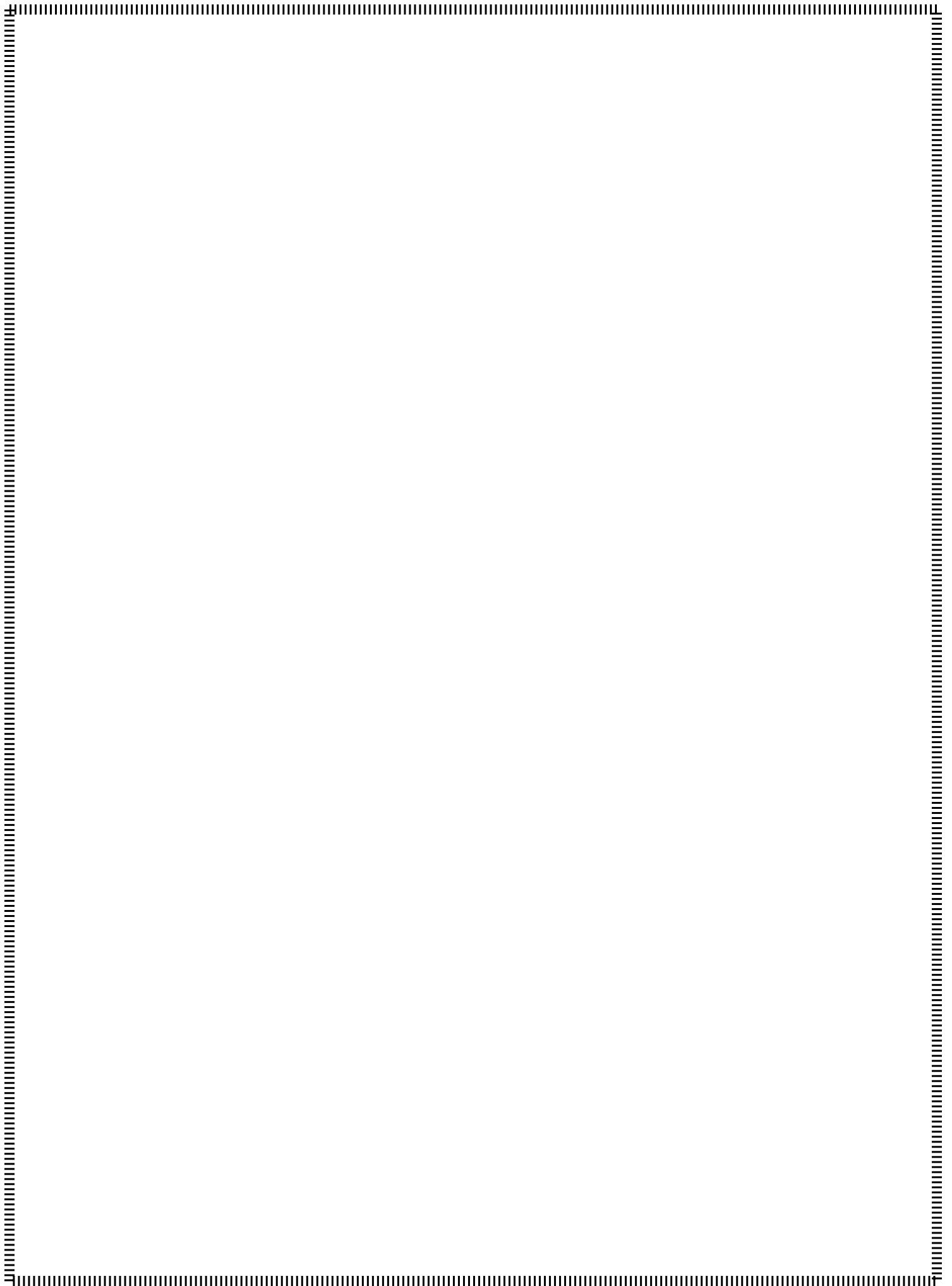


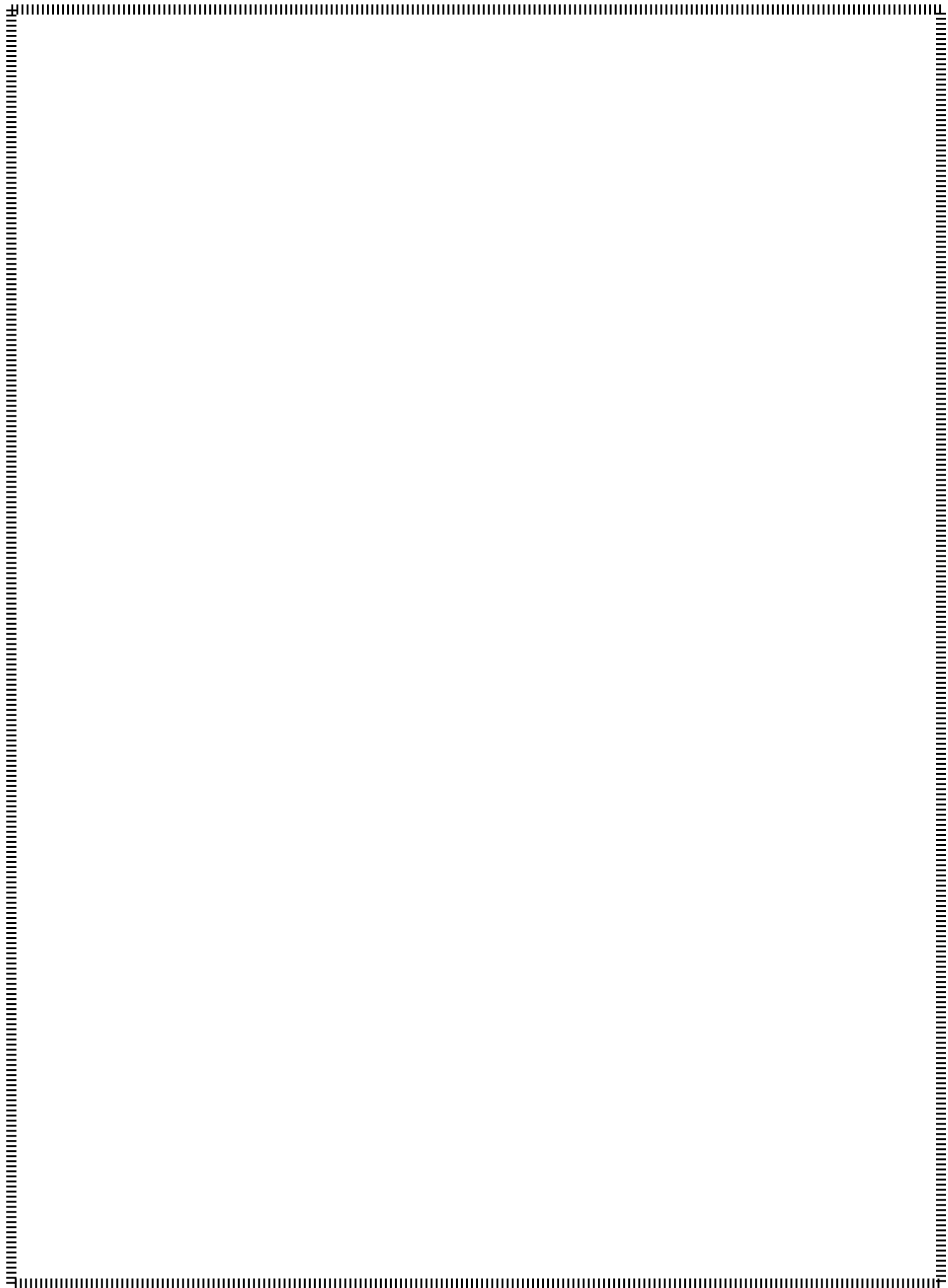


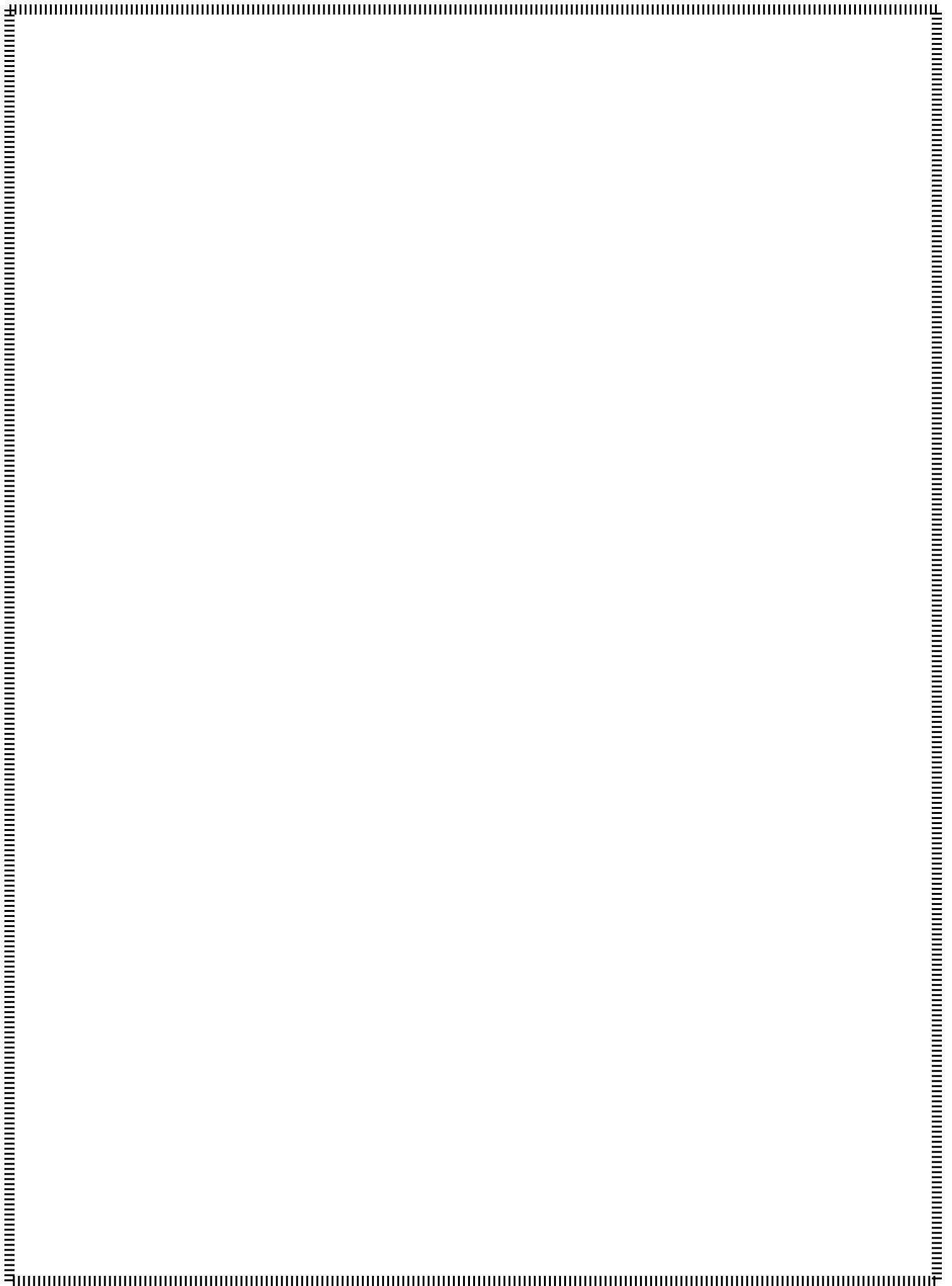


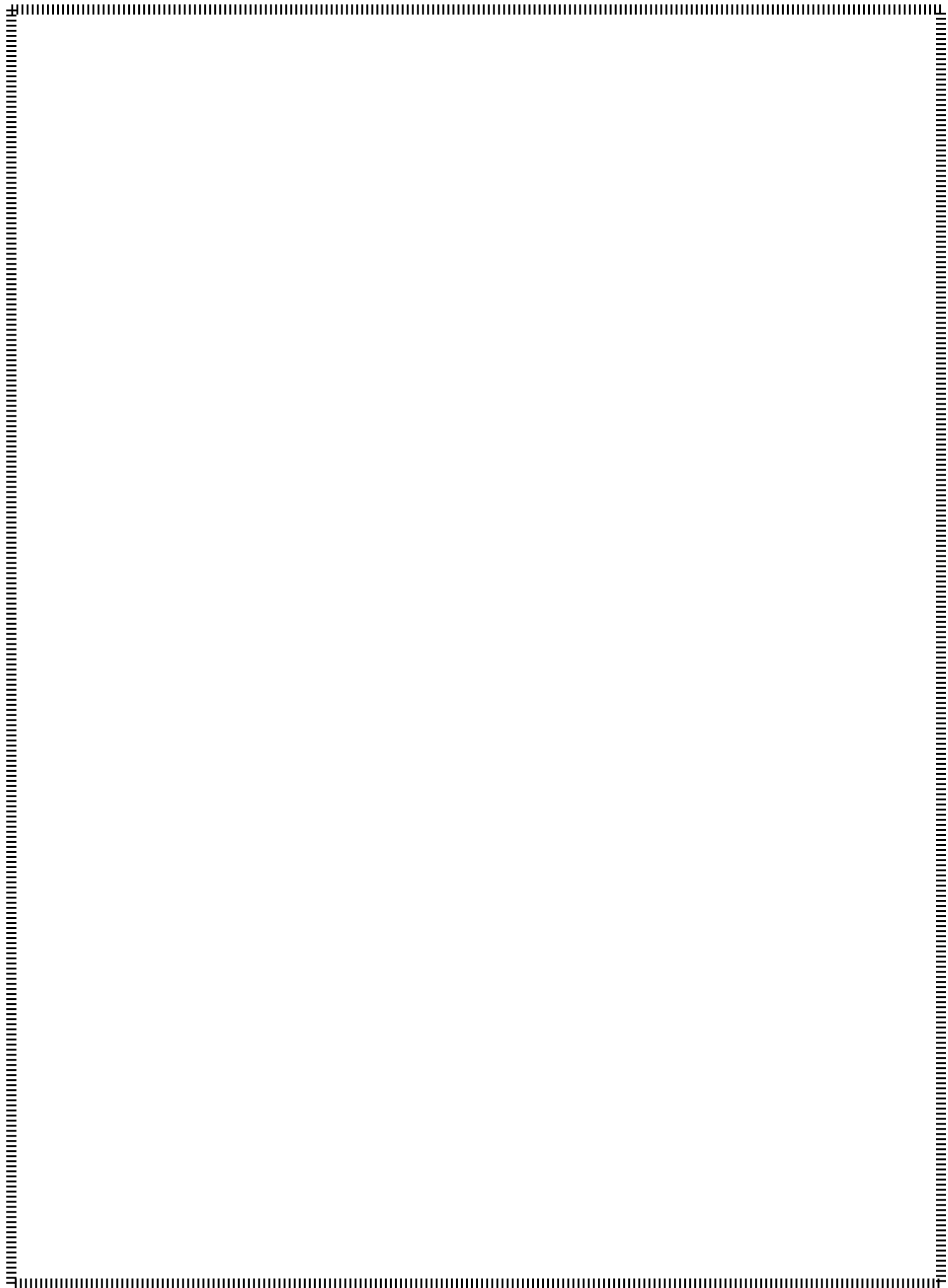


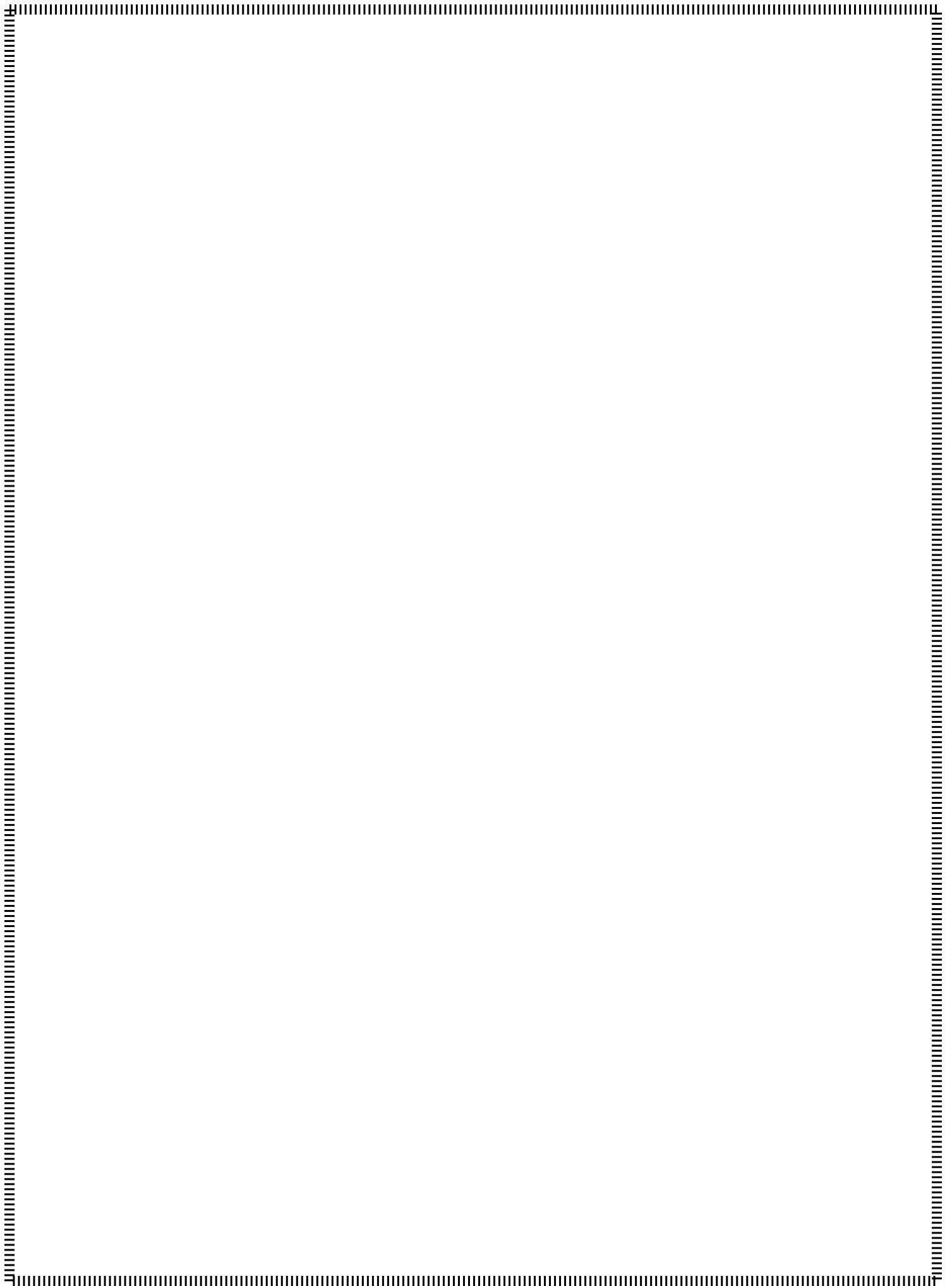


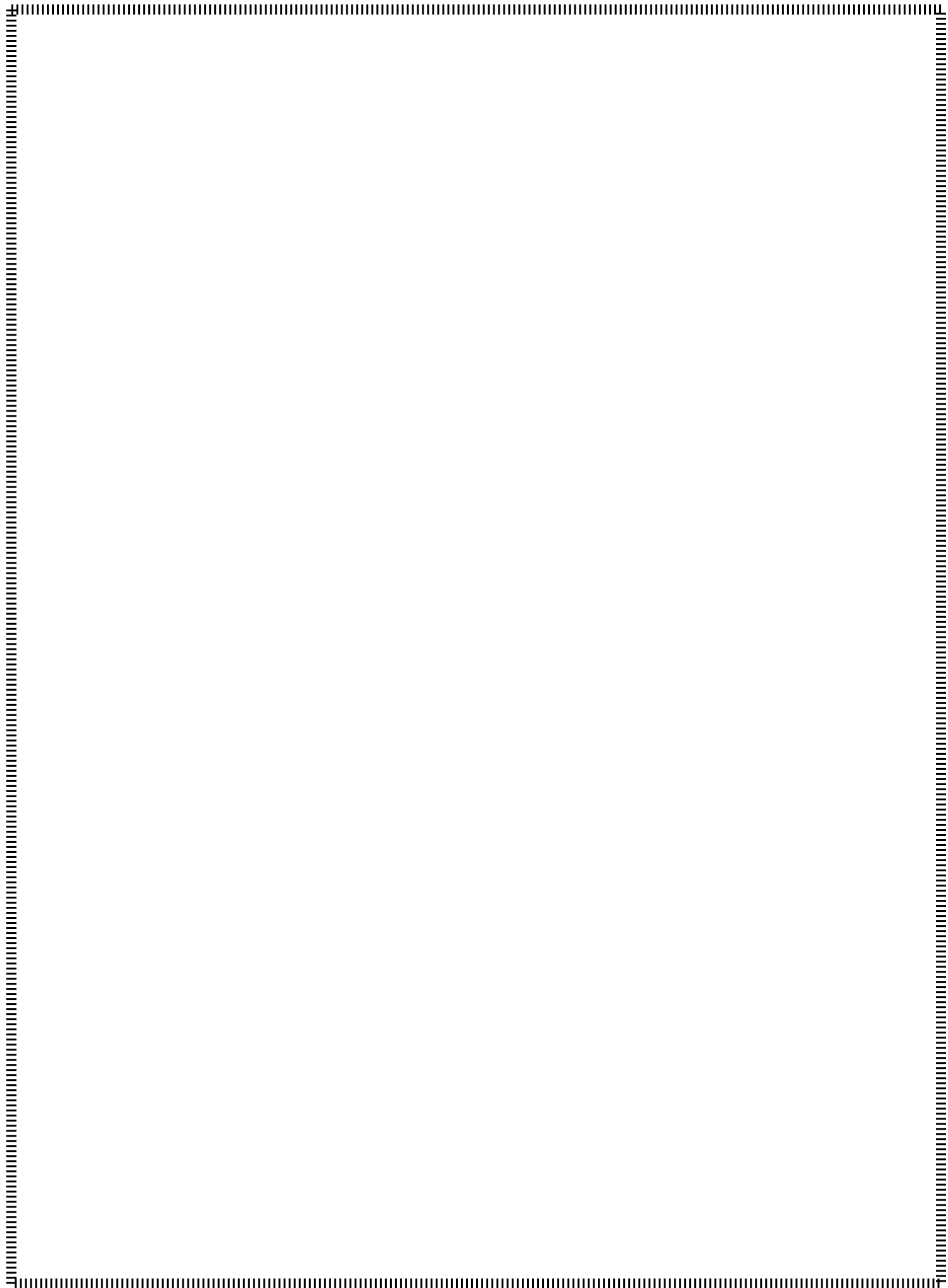


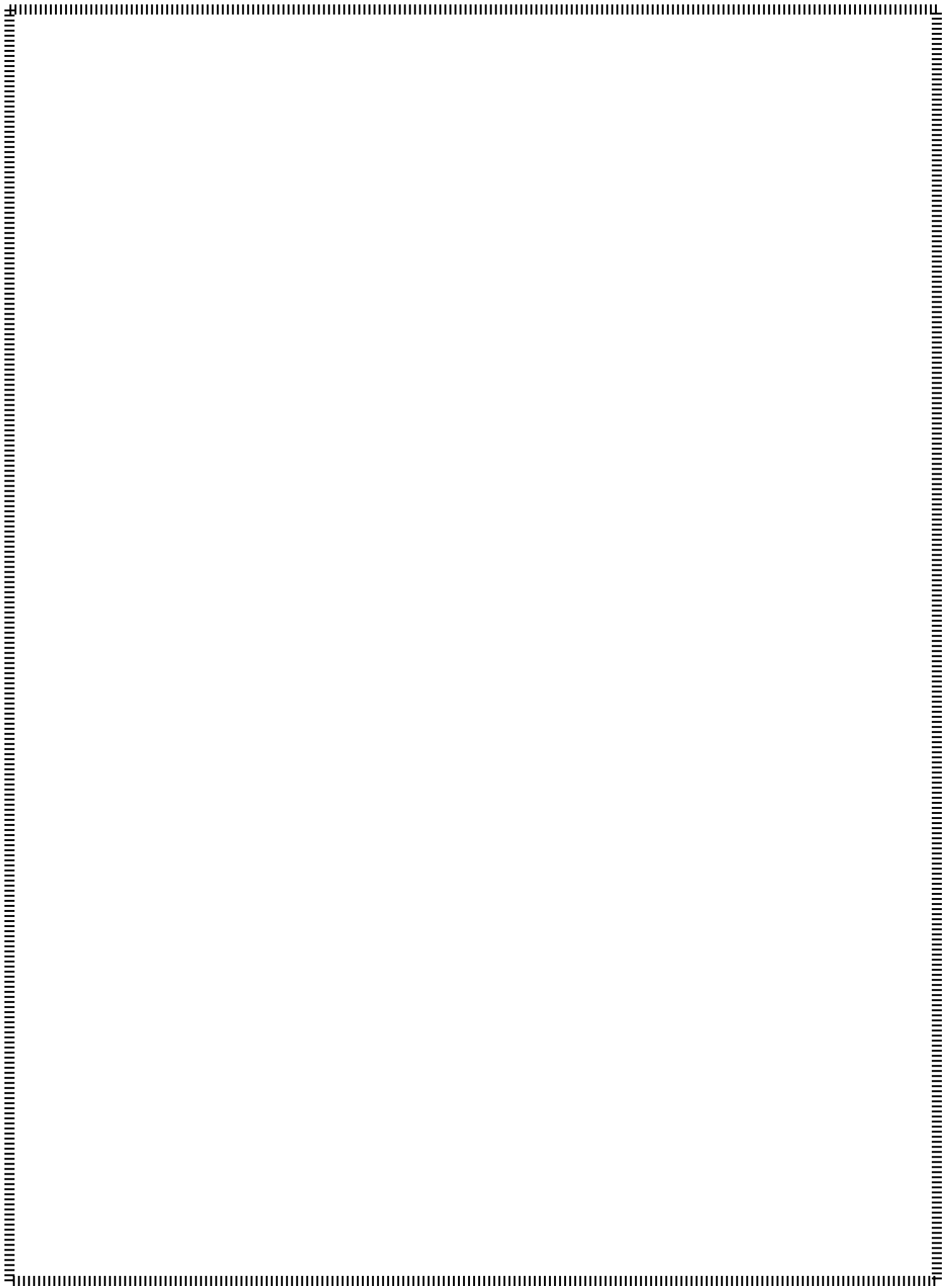


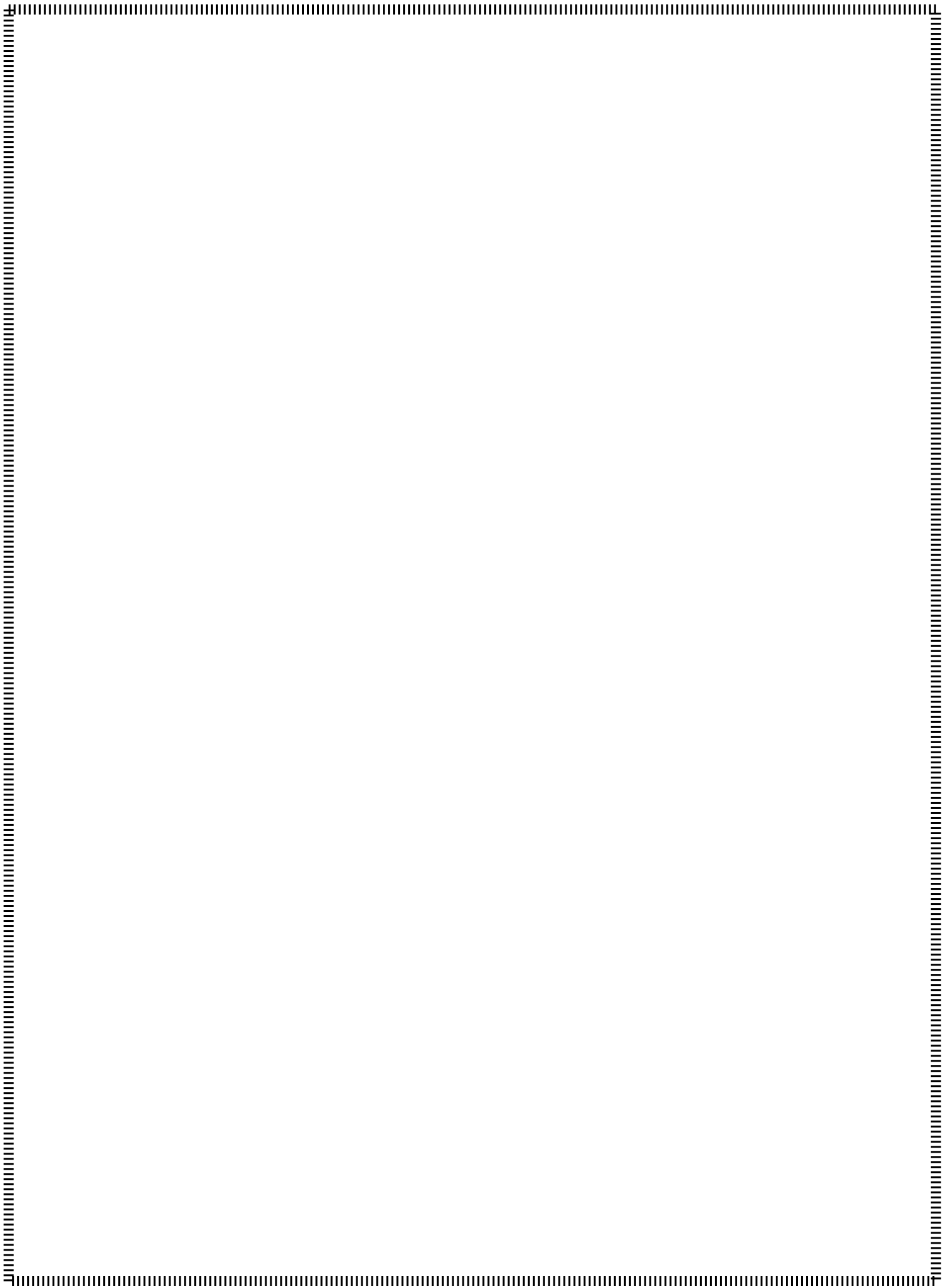


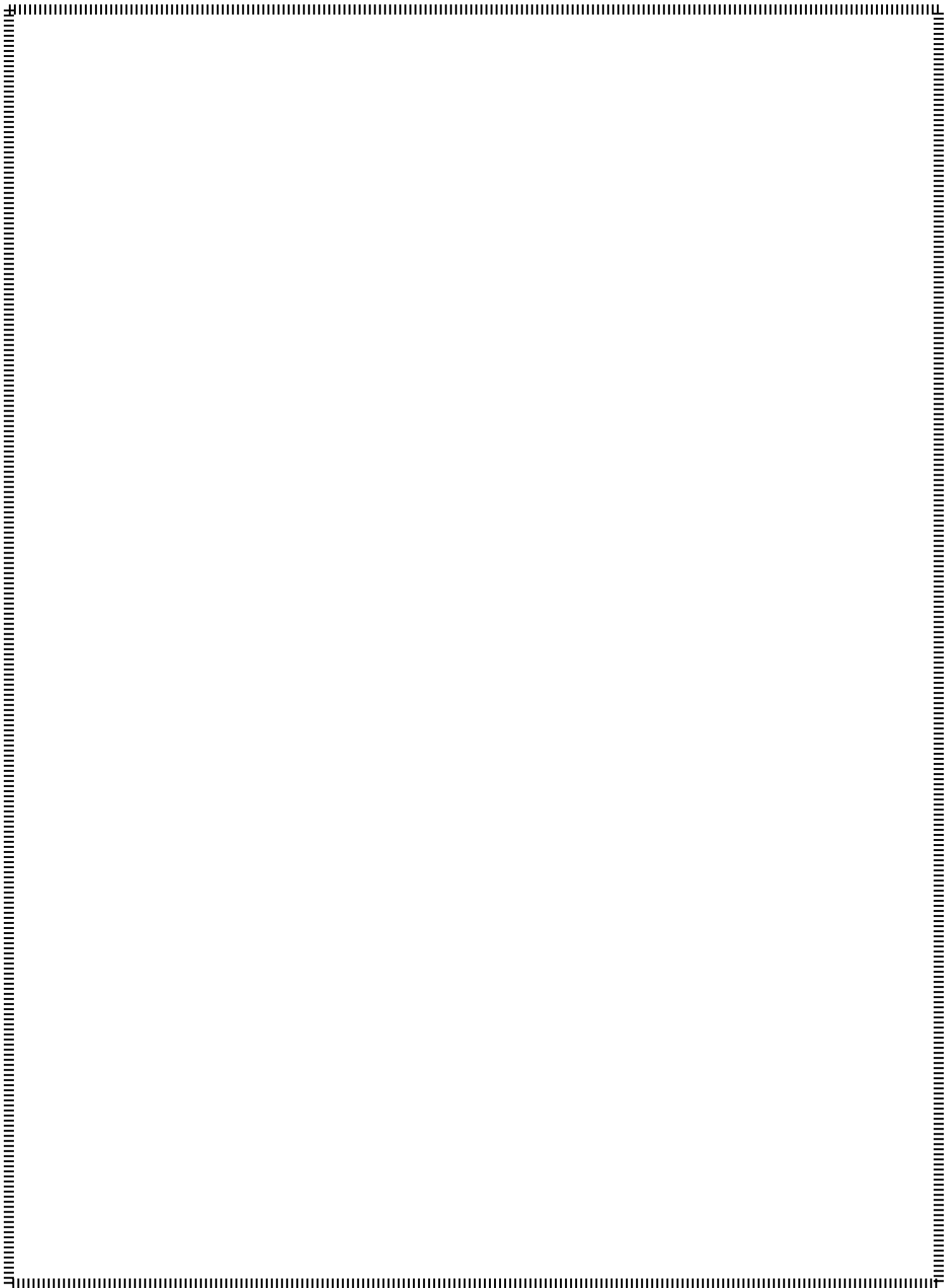


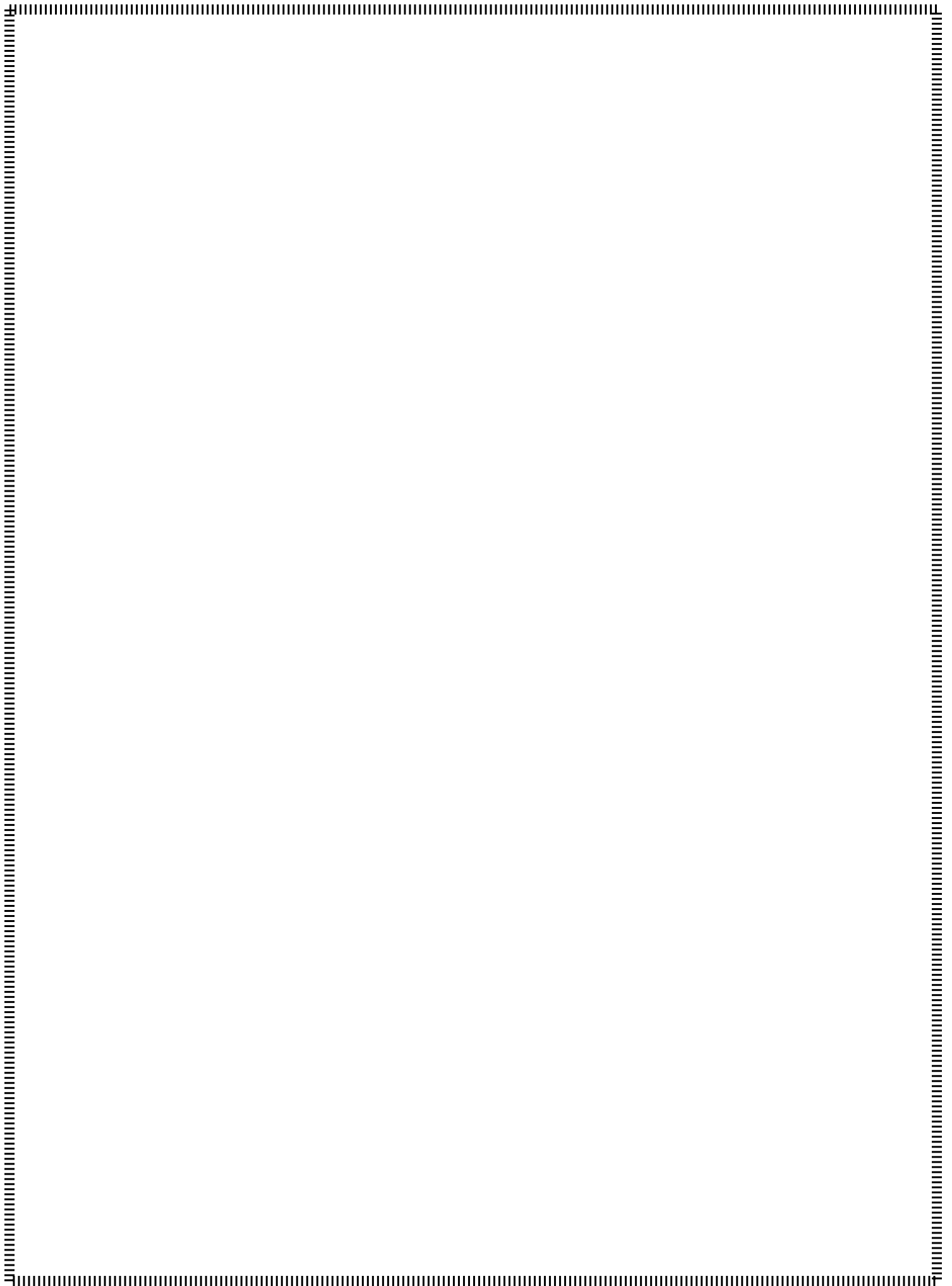


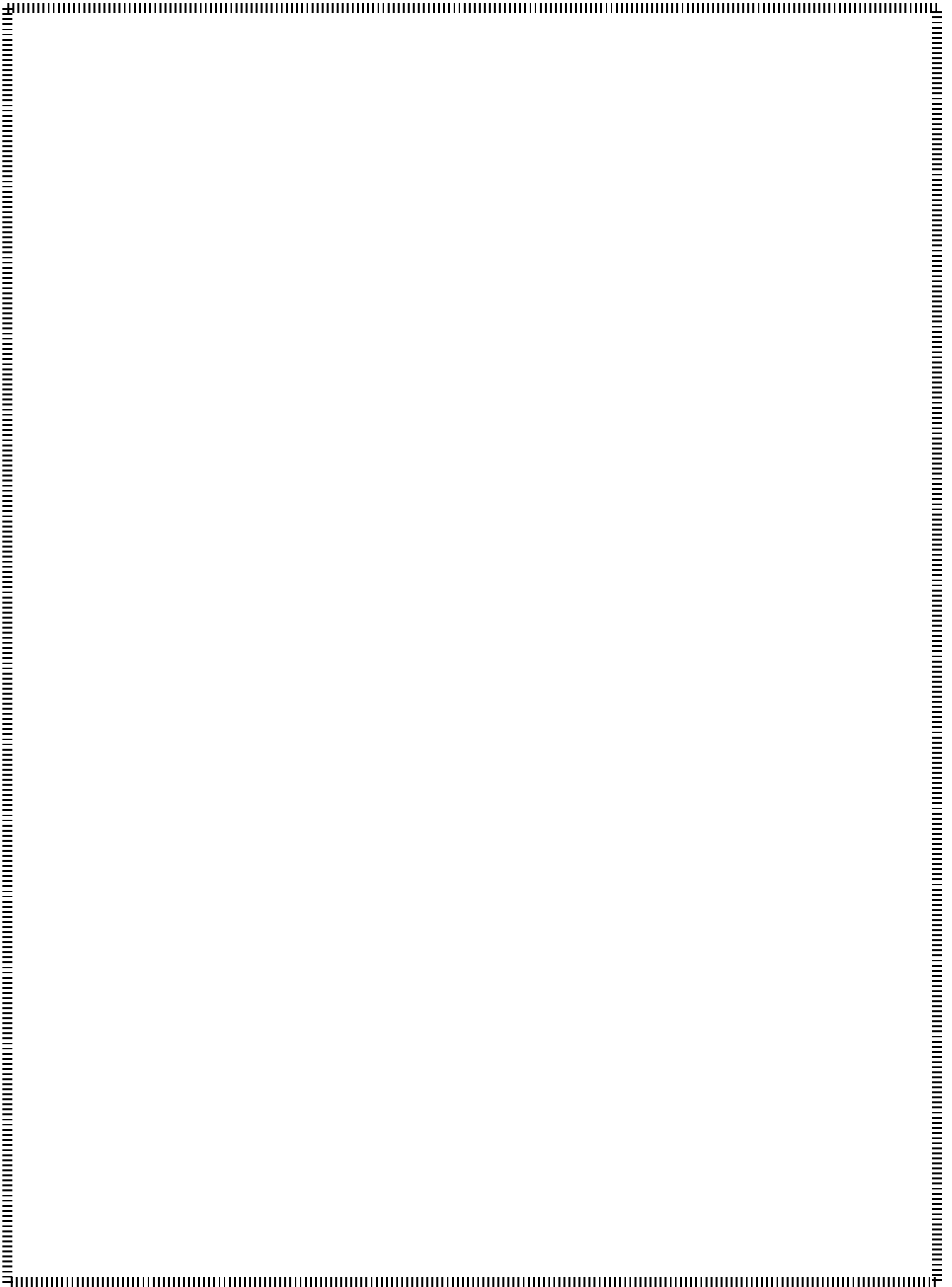


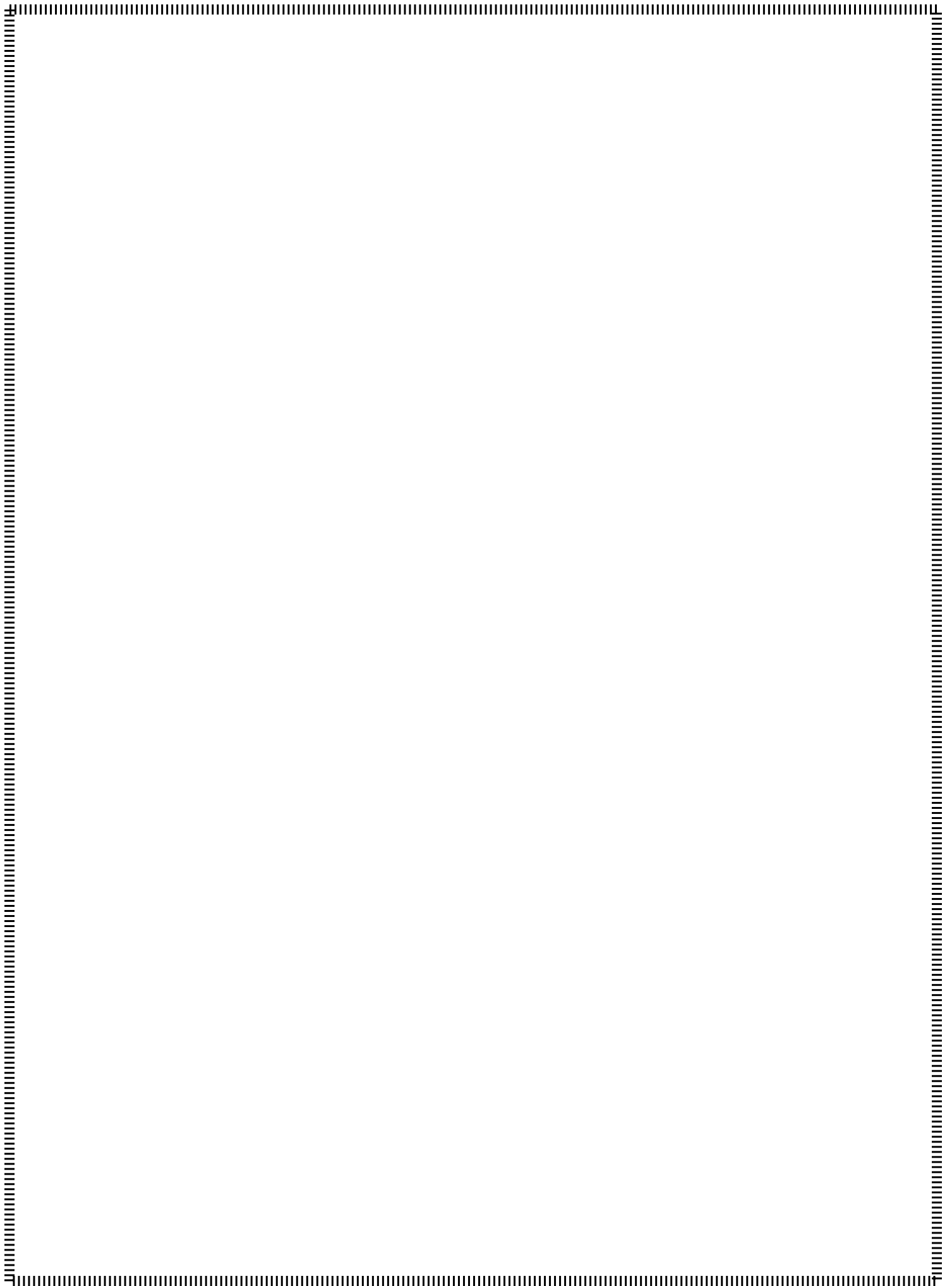












HELP THE BEES!



1. GROW FLOWERS

Growing flowers from spring until fall will give bees the food they need. Bees love many flowers. Here are a few that are easy to grow: lavender, rosemary, daises, rhododendrons, dandelions,



2. PROVIDE AND PROTECT BEE NESTS

Leave patches of bare ground and sticks for bees that nest in the ground. Or put up a mason bee nesting block.



3. AVOID PESTICIDES HARMFUL TO INSECTS

Most insecticides can be especially harmful to bees and other pollinators.



4. SPREAD THE WORD!

Talk to other people about how cool bees are!



WANT TO LEARN MORE?

- BUMBLE BEE WATCH www.bumblebeewatch.org
- XERCES SOCIETY www.xerces.org
- THE BUG CHICKS www.thebugchicks.com
- PORTLAND PARKS & RECREATION ENVIRONMENTAL EDUCATION
www.portlandoregon.gov/parks/ee

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