EVERY SEED COUNTS

Teacher's Guide
PreKindergarten Science Unit

SUNFLOWER LAB

PNM®

Earth's Birthday Project

1 800 698 4438
EarthsBirthday.org

SUNFLOWER LAB

Acknowledgements

Every Seed Counts is offered to New Mexico classrooms through support from PNM, the state's largest electricity provider.

Earth's Birthday Project cultivates hope for the future by inspiring wonder, learning & care of the natural world in children, teachers & parents.

Since 1989, more than 15 million children have delighted in raising butterflies, learning about the natural world & supporting conservation. Our work empowers students to initiate environmentally responsible actions in school & at home.

1 800 698 4438 EarthsBirthday.org

SUNFLOWER LAB

Contents

SUNFLOWER LAB

Overview

Teacher's Guide

Every Seed Counts builds experiences and skills for growing plants and understanding a plant's needs for pre-kindergarten classrooms.

The lab includes Pre and Post Assessments along with 12 activities for learning and integration. Based on your students' skills, use the Sunflower Lab in the ways that you think are best. Please see the Calendar below as a suggested sequence.

Su	M	T	W	Th	F	Sa
			Day 1 Pre Assessment	Day 2 What We Know & What We Learned	Day 3 Read Aloud *Every Seed Counts*	Day 4
Day 5	Day 6 Planting Sunflower Seed Cups	Day 7 Looking & Learning Day-by-Day	Day 8 Sunflower Songs	Day 9 A Growing Dance	Day 10 Word Wall	Day 11
Day 12	Day 13 Counting Mats	Day 14	Day 15 Is It a Plant? Or Not a Plant?	Day 16	Day 17 What Are the Parts of a Plant?	Day 18
Day 19	Day 20 What Does a Seed Need?	Day 21 Handprint Art	Day 22 Post Assessment	Day 23 Celebrate the Earth!	Day 24 The Sunflower Challenge	

Caring for Sprouts, Caring for the Earth

Young children understand what it means to be a good friend. Talk with them about being a good friend. Write their suggestions on the board. How do you treat good friends? Can plants, trees and animals be our friends? Is the Earth that gives us so much - air, water, food, beauty - our friend? How might they like to be treated? What can we do to help them?

Caring for living things in the classroom is a wonderful opportunity to learn that:

- **all living things have needs**
- **they can understand the needs of other living things**
- **they can help with the needs of others**

1 - All living things have needs.
Every child understands their own need for food, shelter and care. And every living thing has these needs. We are all connected.

2 - Students can understand the needs of other living things.
Caring for living things teaches your students that we all have unique needs. Not everyone's needs are the same. What is good for a child might not be good for a plant. The care of a seedling is different than the care of an insect.

3 - They can help with the needs of others.
Students want to interact and be involved with the living things around them. Checking to see if plants need water or if the caterpillars are becoming chrysalises builds a child's confidence and understanding. They learn about responding to what is needed and offering to help.

Teaching Students How to Care for Seedlings
Sprouting seeds in your classroom is a great way to teach children about the needs of plants that we depend on for food. Day by day, they observe how the seedlings grow and change. They can see if the plants need water or less light. It is practical experience in understanding the needs of others and learning how to help.

Sending a packet of seeds home at the end of the school year gives the children an opportunity to share what they learned with their families by caring for their plants until they bloom glorious flowers. Being responsible to help their plants thrive is a good 'job' even for young children.

SUNFLOWER LAB

Pre/Post Assessments

Overview

The activities begin with an individual assessment to effectively establish a baseline of students' understanding, help you decide what to emphasize and what needs to be adapted for your classroom. A pre-assessment provides a way to evaluate the children's growth at the end of the unit.

Materials

- Assessment Record (each sheet holds 15 names)
- handout for each student
- pencils/markers

Adapt the assessment, based on your students skill level.

1 Using a laptop or color print-out with a small group, or projected on the white board for the entire class, show the handout and focus the students' attention on the parts of a plant.

- Tell the students that they will be identifying the parts of a plant by drawing a line from each word to the correct part on the illustration.
- Use the first word that you point out as a demonstration - SEEDS.
- Point to the word SEEDS and say it out loud. Ask the students to look at the illustration and identify the SEEDS. Point out the SEEDS on the illustration and then draw a line from the word to that part of the plant.
- Next point out and say the word LEAF. Ask the students to identify a LEAF on the illustration and draw a line from the word to that part.
- Repeat with the words - ROOT, FLOWER and STEM.

2 On the handout, focus their attention on what a plant needs to grow.

- Plants need SOIL, WATER, SUN and AIR to grow.
- Point to AIR and say it out loud. Ask *Does a plant need AIR to grow?* If it does need AIR, draw a circle around the illustration and word.
- Repeat with the words - SOIL, SUN, SHOVEL, FORK, WATER.

SUNFLOWER LAB

Assessment Record

Student Name	Observing the Features of Living Things		Needs of Living Things	
	Ability to identify a plant and the parts of a plant		Ability to describe what a plant needs to grow	
	Pre	**Post**	**Pre**	**Post**

SUNFLOWER LAB

Name _____

Date _____

Parts of a Plant

Draw an line from each word to a part of the plant.

SEEDS

FLOWER

LEAF

STEM

ROOT

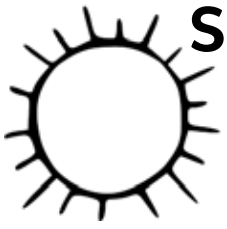
What Does a Plant Need?

Circle the things a plant needs.

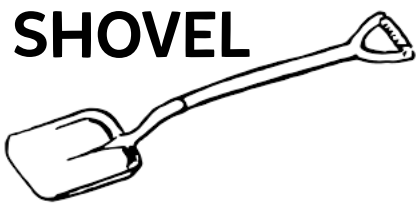
AIR

SOIL

SUN

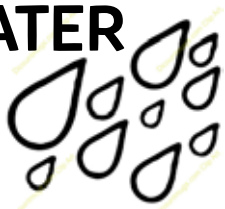


SHOVEL



FORK

WATER



SUNFLOWER LAB
What We Know about Seeds & Sprouts

Overview
Children discuss *What We Know* about seeds and sprouts. The teacher records information for display throughout the unit, including space to record *What We've Learned* during the unit.

What We Know
Example of the diagram on the right

Time
30 minutes

Materials
construction paper, post-it notes, color markers, bulletin board

Step One
Explain to students that you'll be sprouting seeds in your classroom and learning all about them. Explain that this activity gives students a chance to talk about what they alreeady know about plants, seeds and sprouts.

Step Two
Ask the class to tell you - one at a time - what they know about seeds and plants. Write the answers on a post-it note with the student's name.

Talk about the responses. Encourage the students to look for relationships between the responses and to group them in appropriate categories on a petal – i.e. food, growing, parts of a plant, etc.

Step Three
Explain that as the class makes observations, you will write down *What We Learned* on the diagram.

SUNFLOWER LAB

EVERY SEED COUNTS
Read Aloud

Reading the story *Every Seed Counts* aloud with your class is a wonderful way for your students to learn about the cycle of a plant's life and to build close observation skills. Reading the story several times with your students will provide greater vocabulary gains. The vocabulary will also be repeated and reinforced by *Planting Seeds & Growing Sprouts*, singing the songs included here, as well as the other handouts and activities in the *Sunflower Lab.*

Here are a few ideas to enliven multiple readings of *Every Seed Counts*:

- Call & Response - you read a line and the children repeat it back to you.
- Close Observation - point out details in the illustrations as you read and during other readings, ask students to describe details in the illustrations.
- Relate to Seeds & Sprouts - as your sprouts grow, relate events in the story to the children's observations of the seed cups.

SUNFLOWER LAB

Growing Seed Dance

Materials: Instrumental music and audio system

Simple Instructions: Guide students through an improvisational dance. Have students sit on the floor in a circle and ask them to imagine growing plants—how roots appear, then stems and leaves, then flowers. Show them how to curl up as seeds, then uncurl and stand like a growing shoot, and then spread arms and open hands as their flowers bloom. Lead them through the process several times. Then let them try it on their own with music.

After dancers have mastered the basic motions, ask if one or two would like to be gardeners. Show them how to "cover" seeds with soil, using imaginary shovels, and "sprinkle" them with water, using imaginary watering cans. Ask another child to dance the part of the sun, rising in the morning, moving slowly across the sky, beaming (smiling) and sending light to the growing seeds (moving arms in circles). A few others could be rain, coming suddenly to moisten the soil with imaginary drops shaken from their fingertips, moving slowly away as sprouts begin to grow, and lingering on the distant horizon (at the boundary of your dance area).

Use your dance often as a wake-up exercise or a break from study, allowing students to rotate through the different parts. Be sure to try it out in the schoolyard where the children can get really big!

SUNFLOWER LAB

Planting Sunflower Seed Cups

Overview

The students plant sunflower seed cups. Each child prepares one 9-oz plastic cup with paper towels and "plants" approx. four seeds, so that sprouting and growth can be observed in detail.

Suggested Time

One 30-minute session

Materials

20-25 8-oz plastic cups, one for each child
paper towels - 2 per cup
2 packets of sunflower seeds for planting
masking tape for name label
1 Sharpie or permanent marker

Easy Instructions for Sprouting Seeds

- Following as the teacher demonstrates, each child will make a seed cup.
- Everyone starts by washing their hands.
- Fold one paper towel in half and use it to line a plastic cup.
- Wad up the other towel and stuff it into the cup to hold the liner in place.
- Each student receives 4 sunflower seeds. With your fingers, slide one seed between the paper liner and the side of the cup.
- Put four seeds in one cup. Seeds should be near the middle or approx. an inch from the top of the cup. If one slides to the bottom, add another seed near the middle.
- Put water into the cup a little at a time, so that the paper towels are evenly moist with only a little extra water at the bottom of the cup. The paper towels will wick moisture up to the seeds.
- Mark a horizontal line beside each seed with a marker to show the middle of the seed. This will help students observe growth below and above the line.
- On a piece for masking tape, write the student's name and tape it vertically on the cup.
- Everyone finishes by washing their hands.

SUNFLOWER LAB

Planting Sunflower Seed Cups

Tips
The teacher will want to have 2-3 replacement cups, just in case.

A little mold may grow on the paper towels; this is usually not a problem.

Keep the cups in a well-lit area with indirect sunlight. Choose a location with a consistent, warm temperature. Be careful of window sills – cold temperatures can freeze the sprouts; direct sunlight can dry them out.

IMPORTANT
Check that the paper towels are moist at the beginning and end of each day. They dry out quickly at any time of year. Over the weekend, cover the sprouts loosely with plastic wrap or moist paper towels.

What do you do with the sprouts after we are done studying them?
After approximately two weeks, the sprouts get leggy and no longer thrive. Sunflower sprouts do not transplant well.

Here are a few ideas:
The sprouts can be fed to animals at your school like hamsters or rabbits.

Add them to a compost pile or bury them to decay in the ground.

SUNFLOWER LAB

Looking & Learning Day-by-Day

Observing the growth of the sprouts every day is an excellent opportunity to build a variety of science literacy skills like looking closely, focus, a wider vocabulary and verbal expression.

• Each student should have their seed cup, a Looking & Learning Day-by-Day handout and the Looking & Learning Cut-outs.

• As a class, ask the students to look closely at each seed. One at a time, have several students describe aloud one detail that they see. Write key words on the whiteboard.

• Explain that the class is using the Looking & Learning Day-by-Day handout to record and learn about how sprouts grow. On Cut-outs, have the students choose a picture that looks the most like their seeds. Cut it out and paste it on Day 1 of the handout.

• Every day take a few minutes to observe the sprouts, select a picture and paste it on Looking & Learning Day-by-Day.

• Every 3-4 days, take a little more time for a class discussion and writing key words on the whiteboard. Can you see more details as the sprouts grow bigger?

• Ask the students to describe colors, shapes, size and what it might be similar to. Encourage them to use vocabulary from *Every Seed Counts*.

Timeline for Sprouts

DAY 1 Prepare seed cups, plant the seeds.

DAY 2-5 Root tips sprout from the seeds.

DAY 6-10 Secondary roots appear. Stems grow to and above cup rim.

DAY 11-15 Cotyledons (cot-I-lee-dun), sometimes called “seed leaves,” come out of the shells. These are the first two leaves that you will see. Some sprouts will also develop two or more additional leaves, depending on how long they are allowed to grow.

SUNFLOWER LAB

Name _____

Looking & Learning Day-by-Day

Date _____

Each day look closely at your sprouts. Paste a picture that looks most like your sprout on each day.

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7

Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14

SUNFLOWER LAB

Name _____

Looking & Learning Cut-outs

SUNFLOWER LAB

Three Flower Songs

This Little Seed

Sing to the tune of "This Old Man, He Played One"

This little seed tiny and small,
It is the tiniest seed of all.
But with sun and soil and the rain falling down,
It will grow up through the ground.

This little plant small and green,
It is the smallest plant I've seen.
But with sun and soil and the rain falling down,
It will grow up big and strong.

This green plant grew so tall,
It had the prettiest flower of all.
And with sun and soil and the rain falling down,
The bees were buzzing all around.

This little flower started to nod,
It grew seeds within its pod.
So with sun and wind and the rain falling down,
Its seeds flew onto the ground.

Sunflower Song

Sing to "I'm a Little Teapot"

I'm a little sunflower,
I'm so small.
Soil, sun and water
Make me tall.
When I get all grown up
You will see
That I'm as big as I can be!

Flower Song

Sing to "Sing a Song of Sixpence"

Sing a song of flowers,
flowers all around,
Flowers that are growing,
growing in the ground
Flowers of each color
make a pretty view,
Red and orange and yellow
And blue and purple, too.

Sunflower Word Wall

The Word Wall includes 18 words from *Every Seed Counts*.
It is a set of domain-specific words that are all related to plants.
Introduce the word wall and utilize throughout.

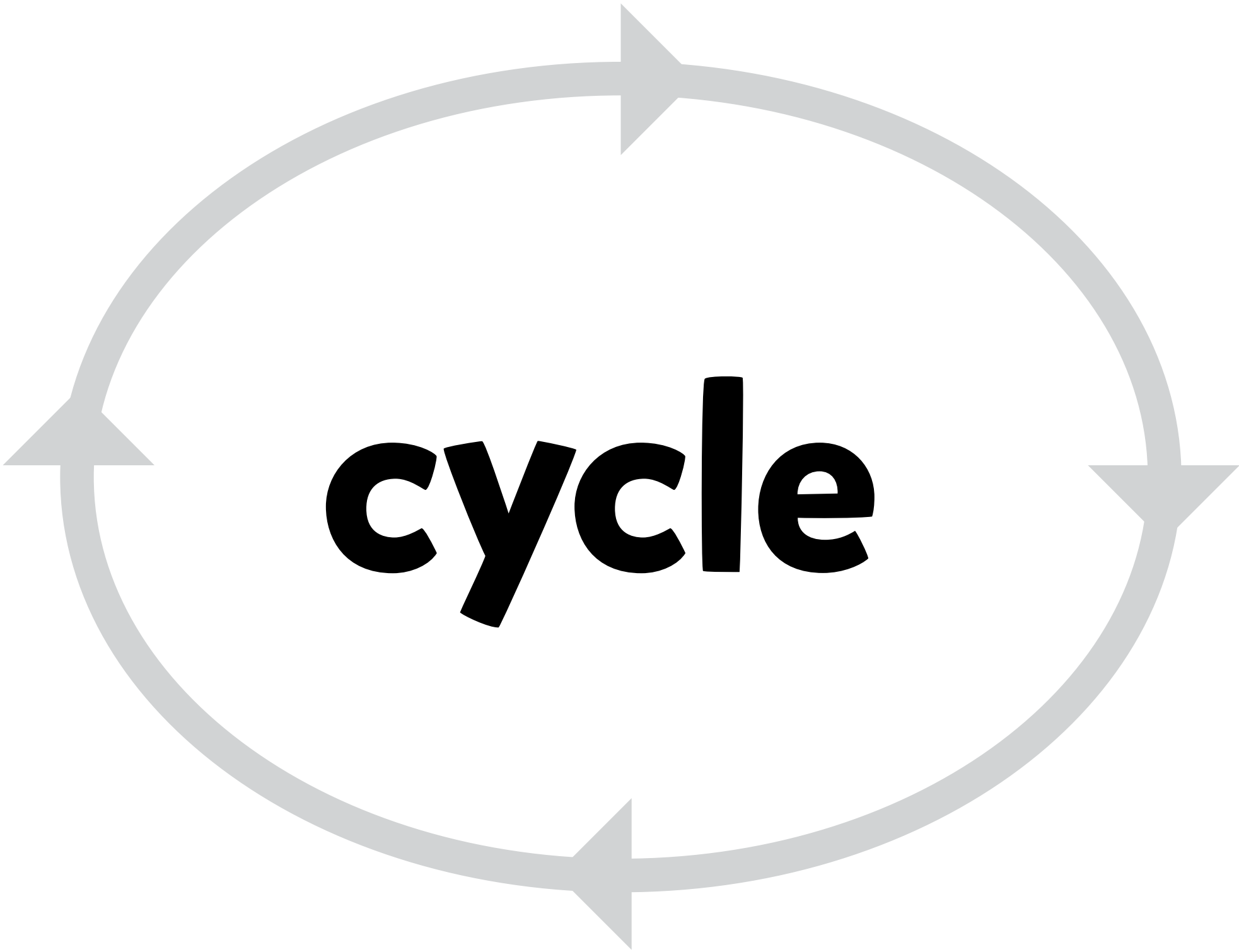
Here are ideas for using the Word Wall:

- Tracing - have your students trace the letters of each word with a finger. The students can say the letter out loud or silently. Pronounce the whole word at the end.
- Act It Out - as you go through the words, act out the meaning with your hands or your whole body. Especially good for kinesthetic learners.
- Relate to Seeds & Sprouts - as your sprouts grow, encourage the children to use these vocabulary words to describe what they see.

air

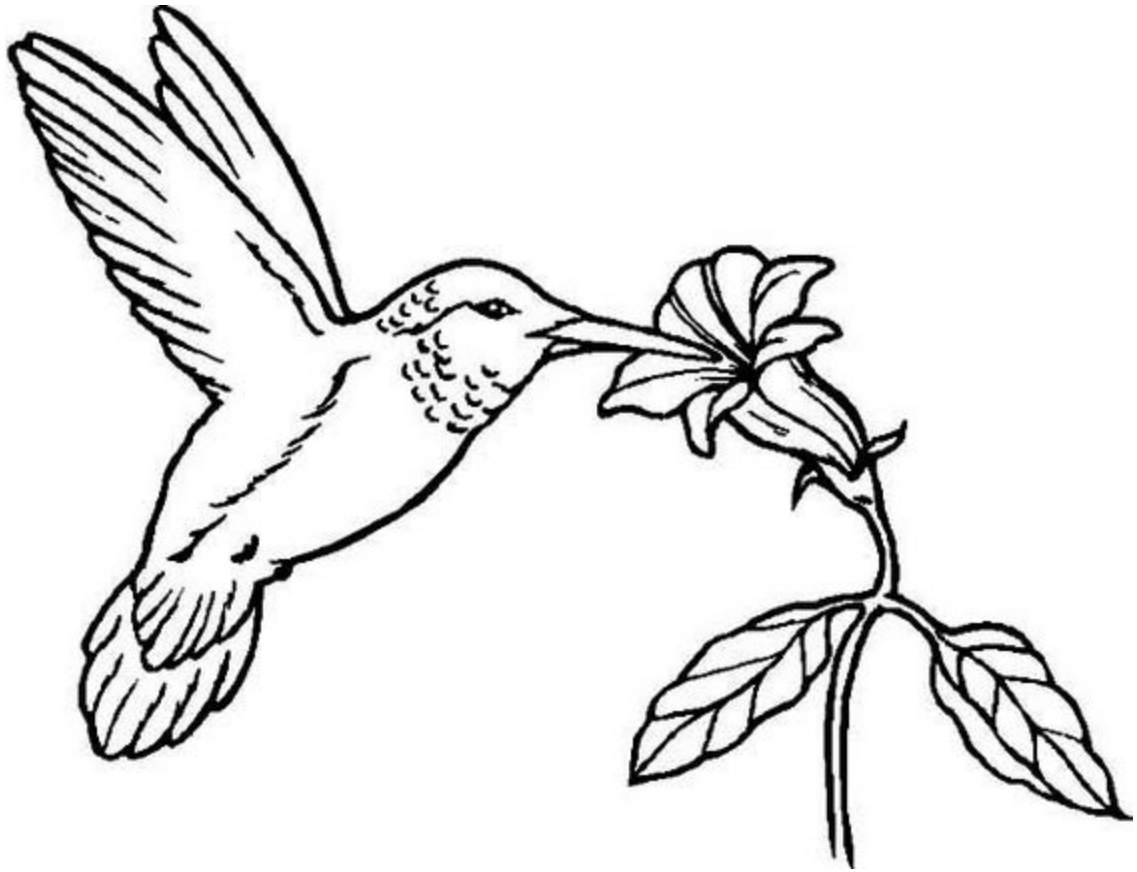
bee


pnq


cycle

flower

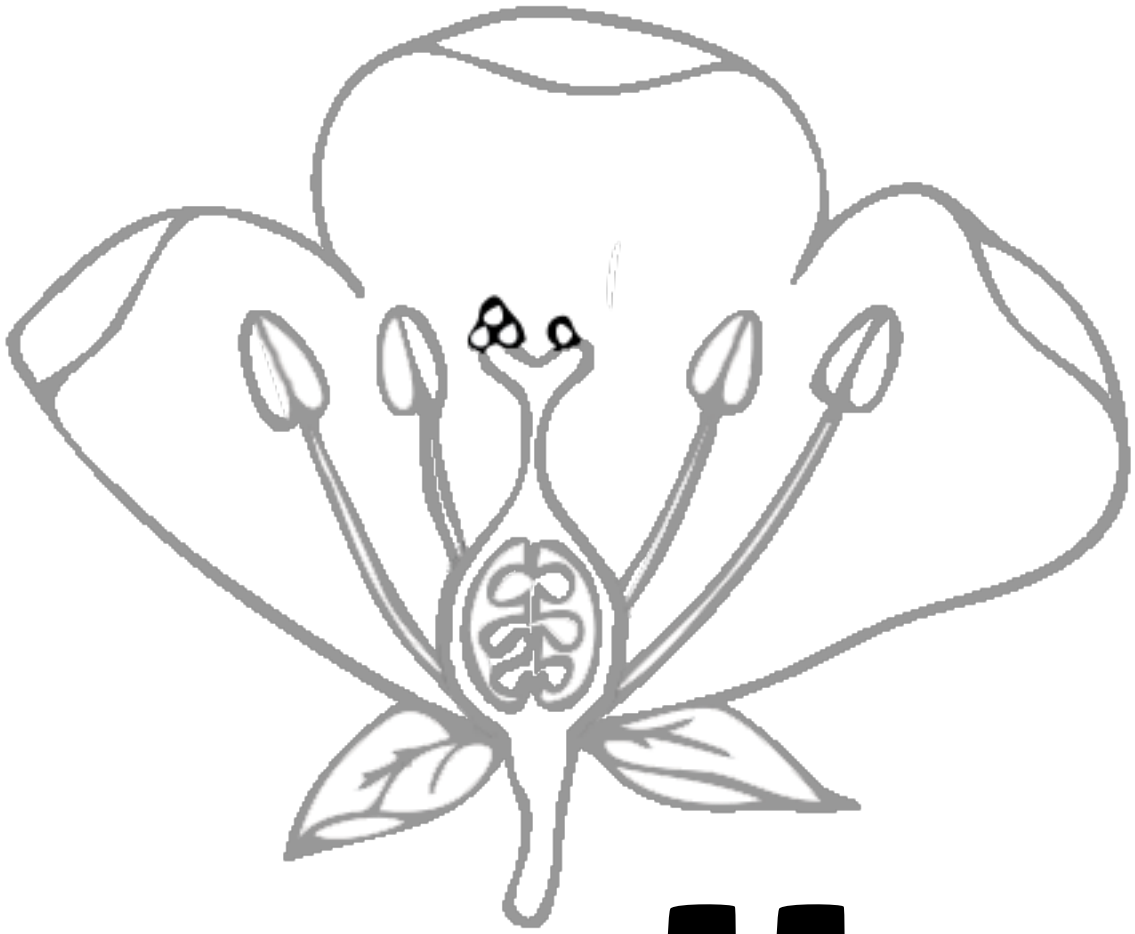
leaves



nectar

petals

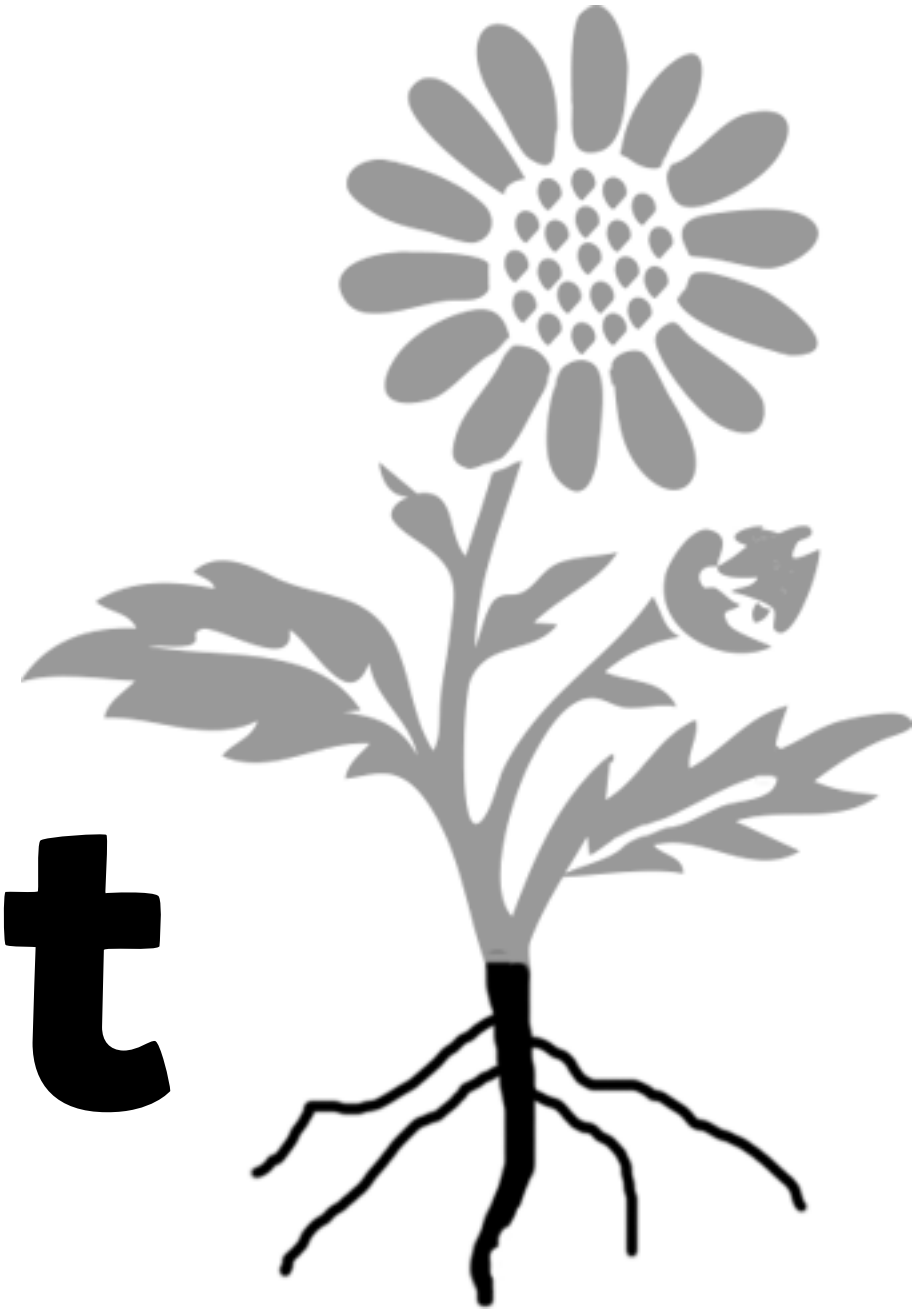
plant



pollen

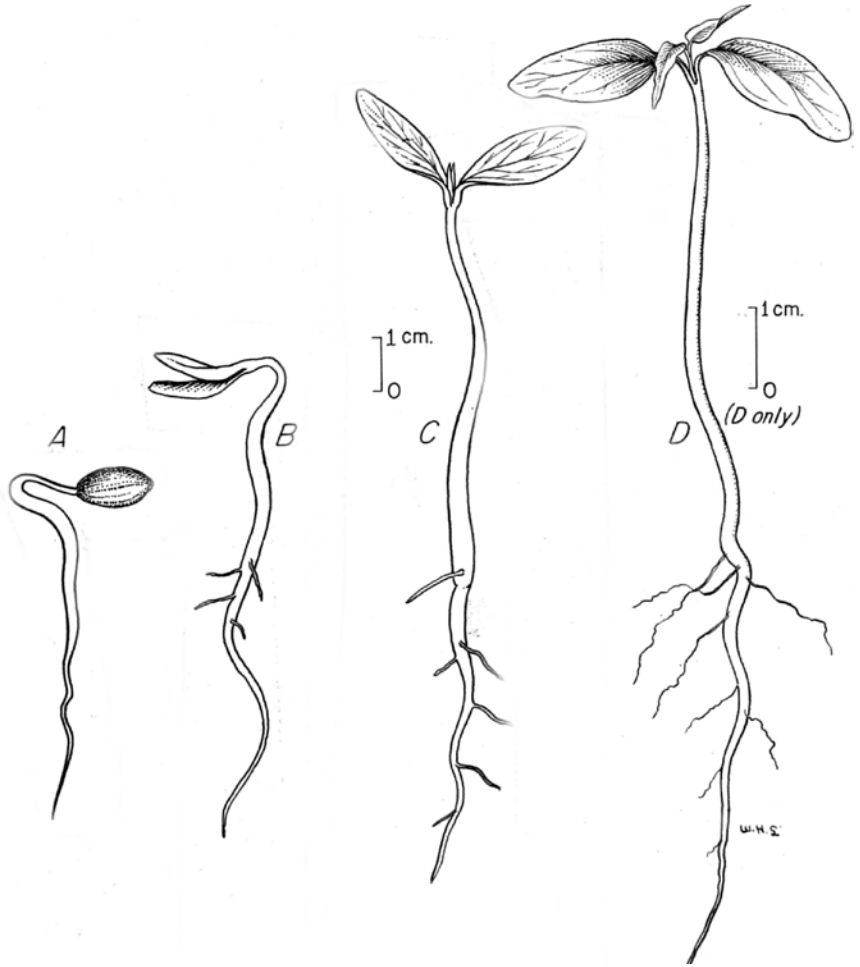
rain

root



seed

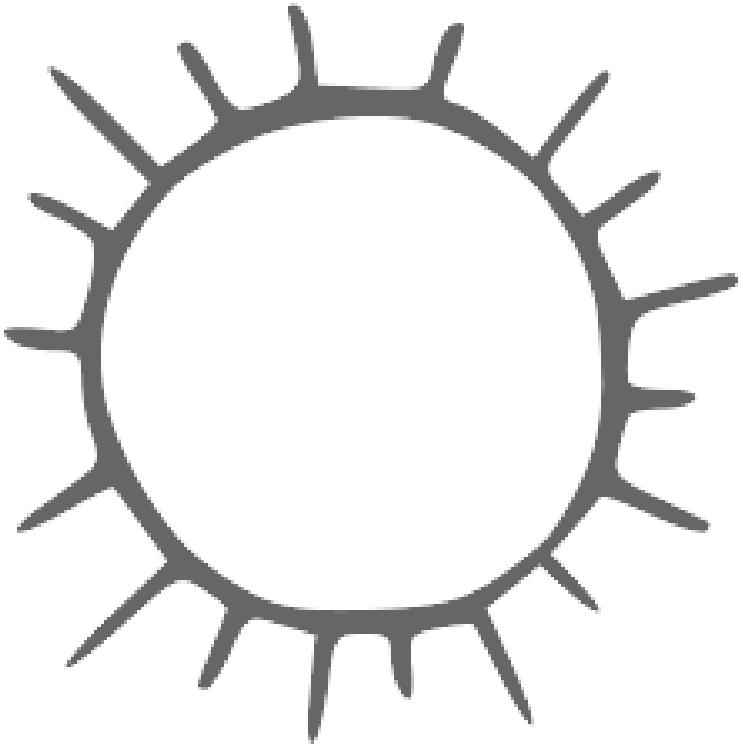
soil



sprouts

stem

uns



sunflower

Sunflower Counting Mats 1-10

Sunflower Counting Mats help children learn and count numbers 1-10 and develop motor skills by working with playdough or modeling clay.

Print out one set of the counting mats and slide them into page protectors or laminate them for your math center.

For counting put one seed in each box. Use small balls of playdough, sunflower seeds, big buttons or paper clips as counting pieces.

Make playdough snakes and shape them into the large numbers.

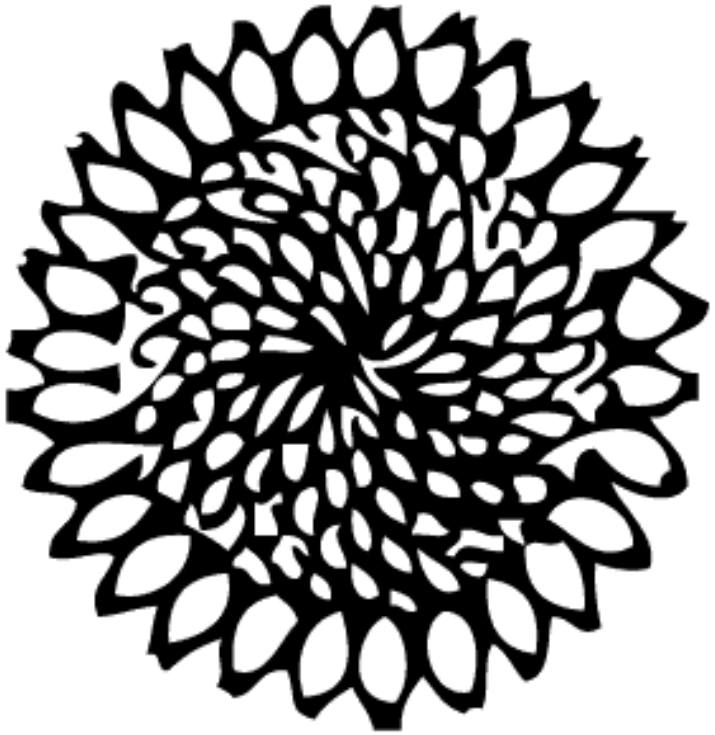
one

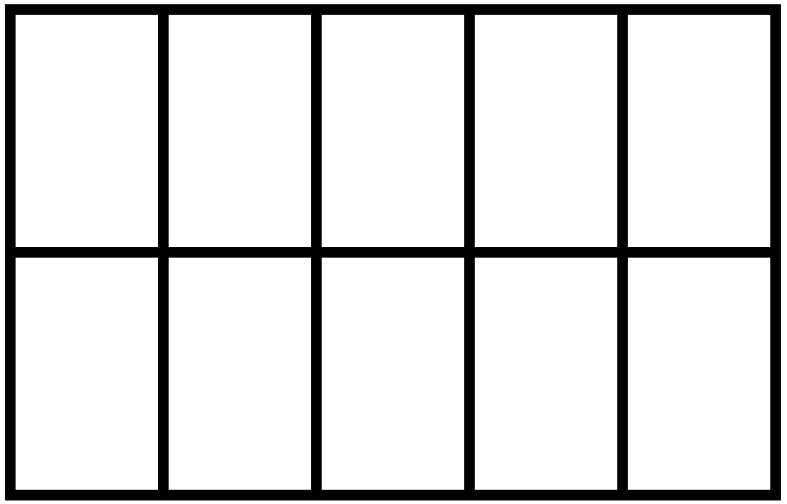
two

2

three

3





4

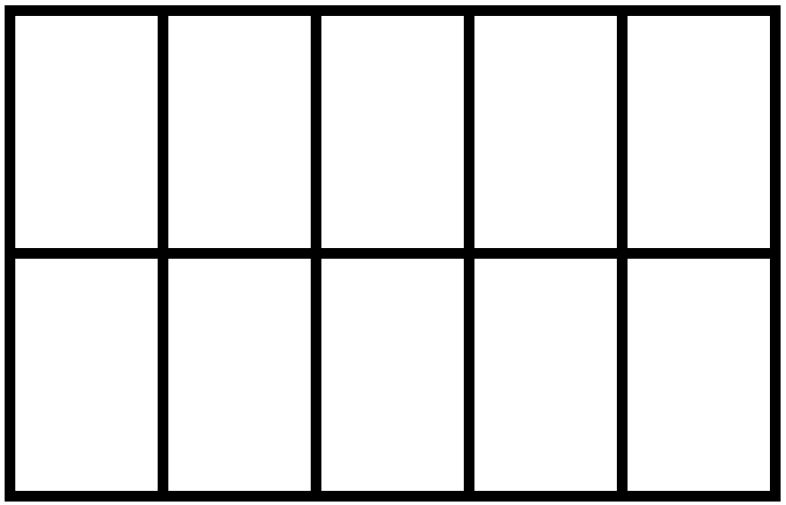
four

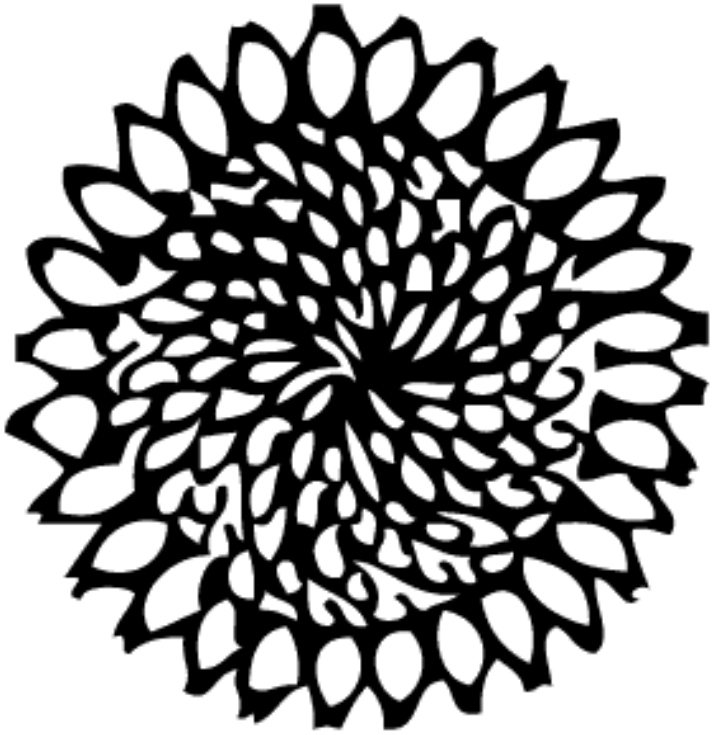
five

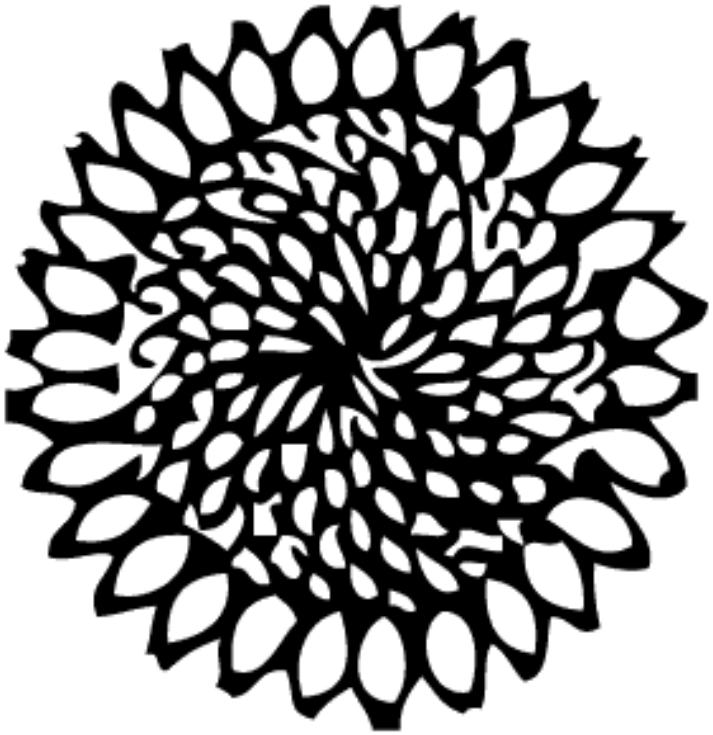
5

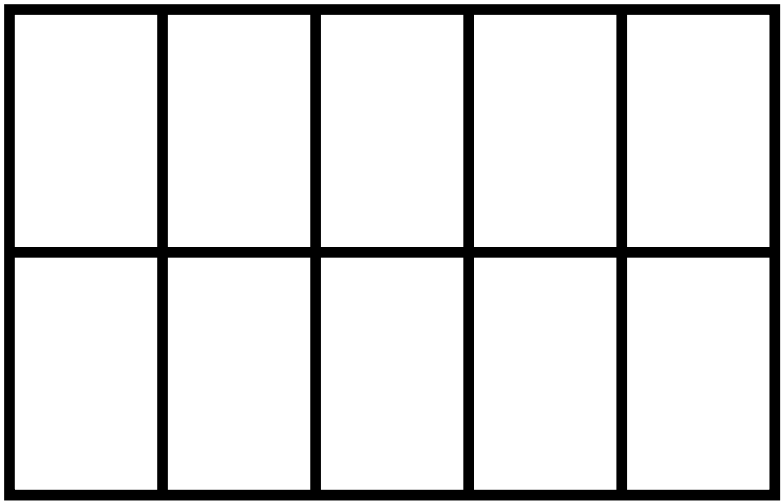
XIS

9









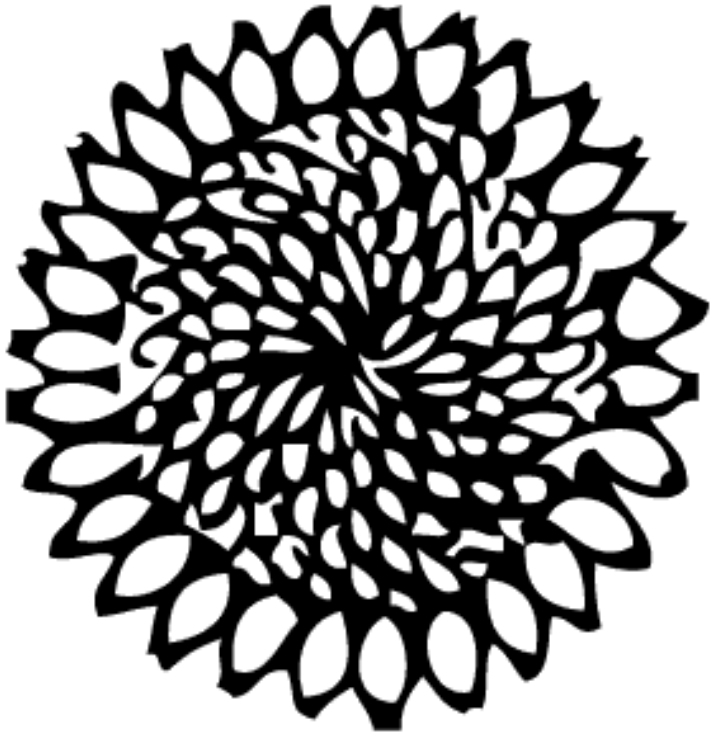
7

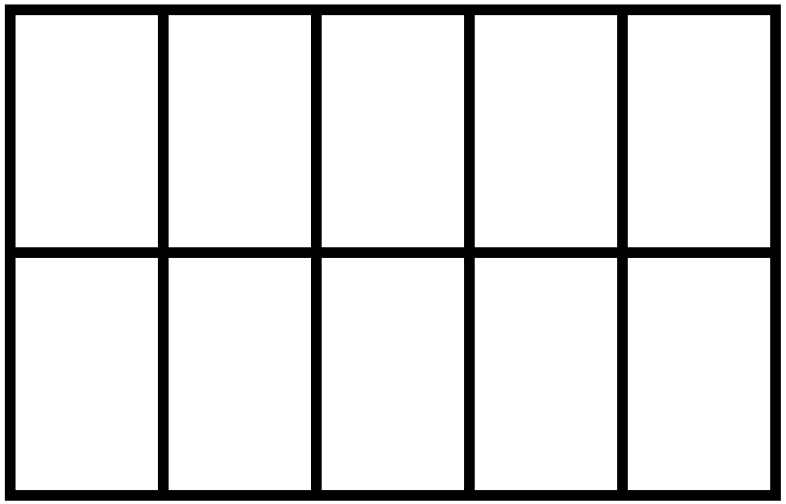
seven

8

eight

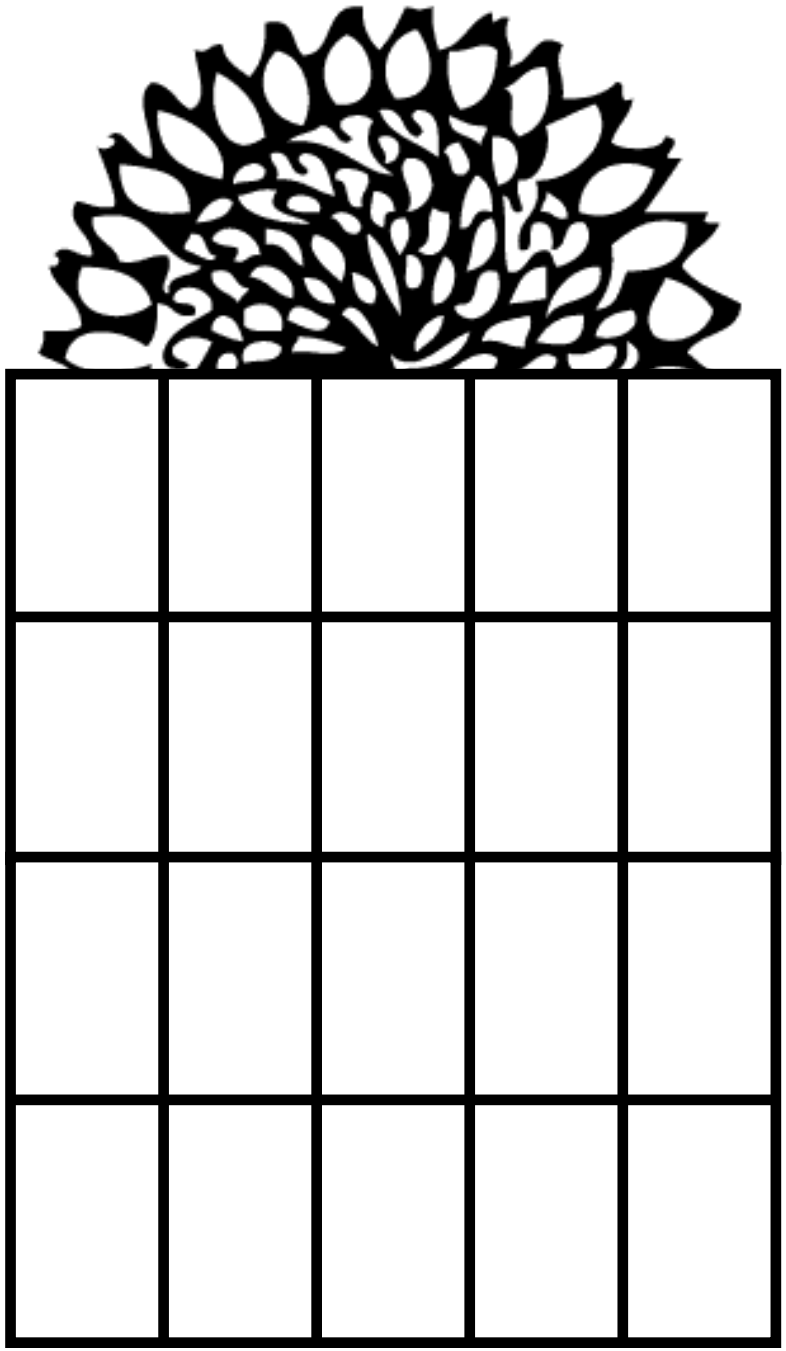
nine





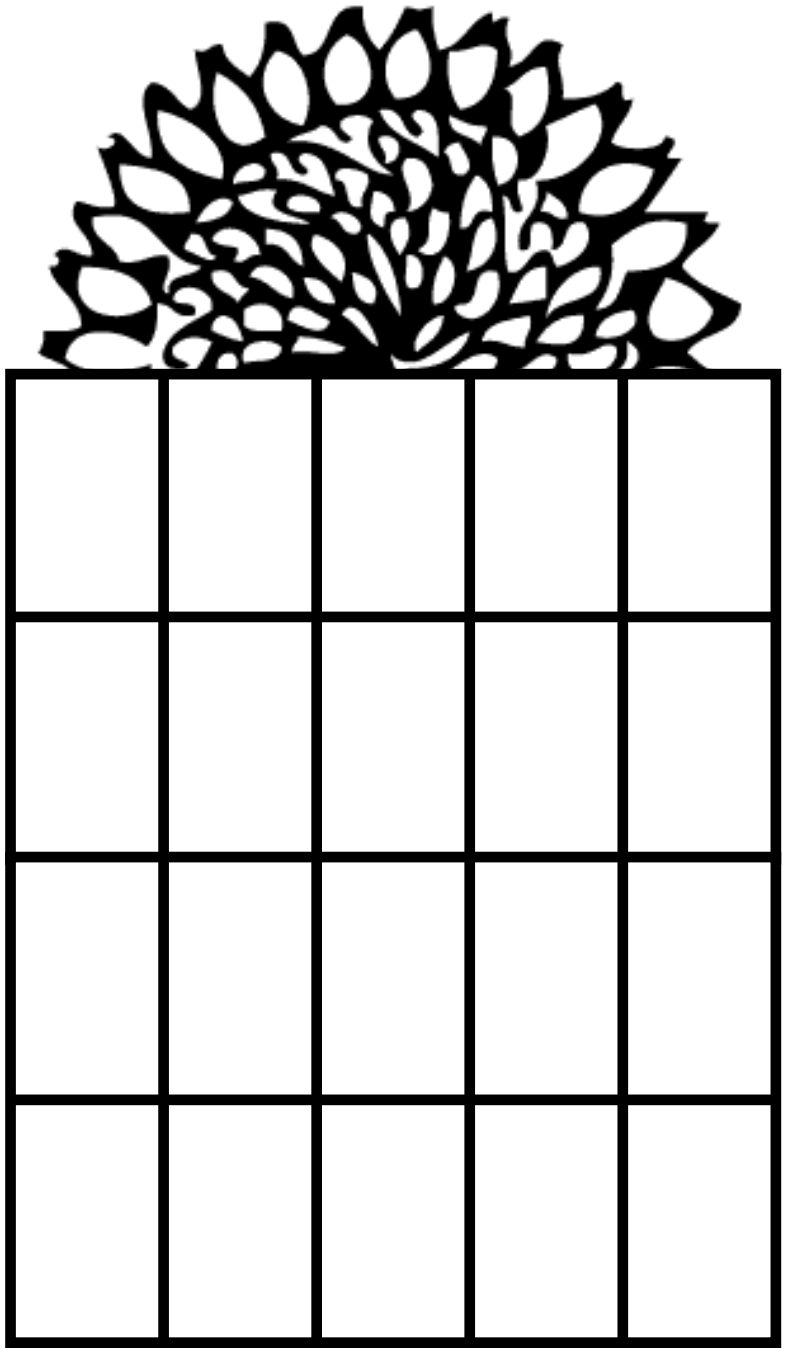
10

ten



11

eleven

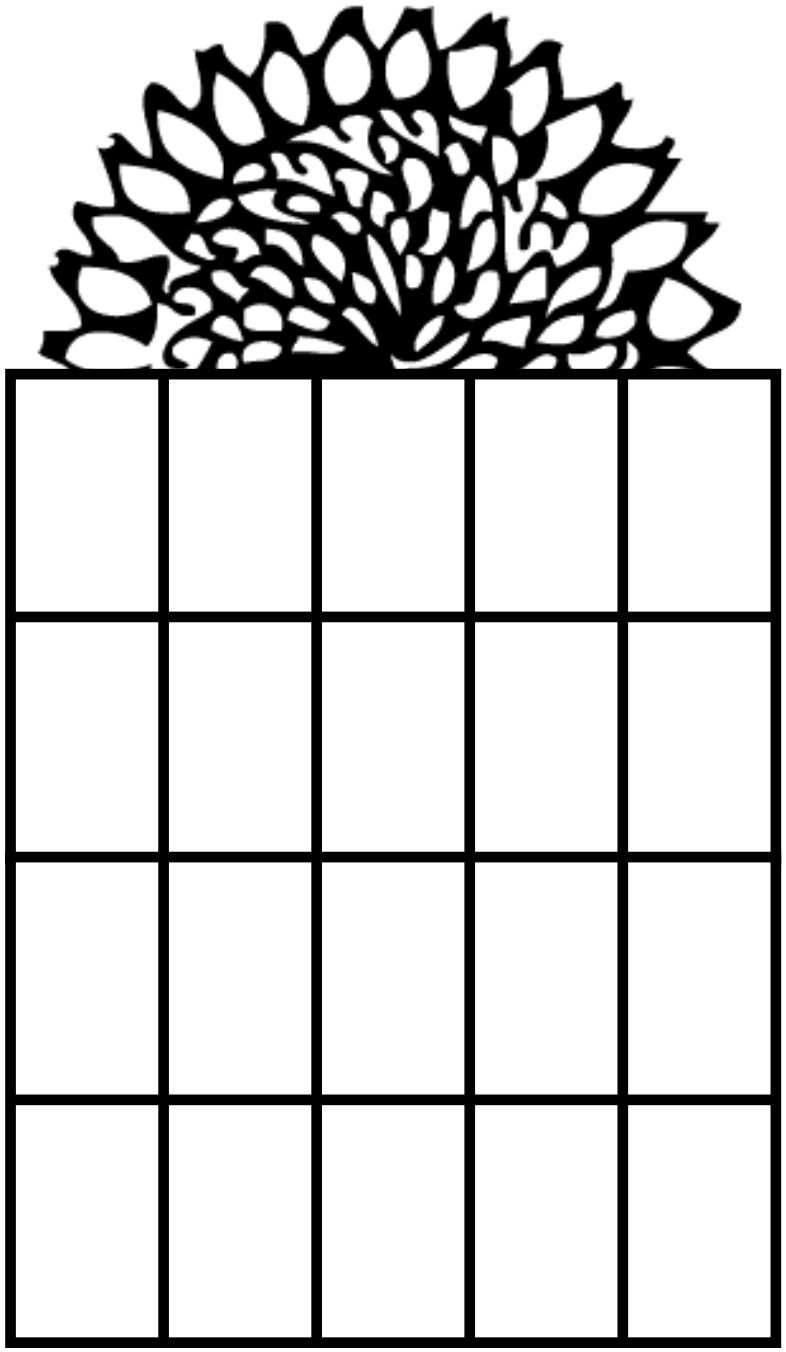


12

twelve

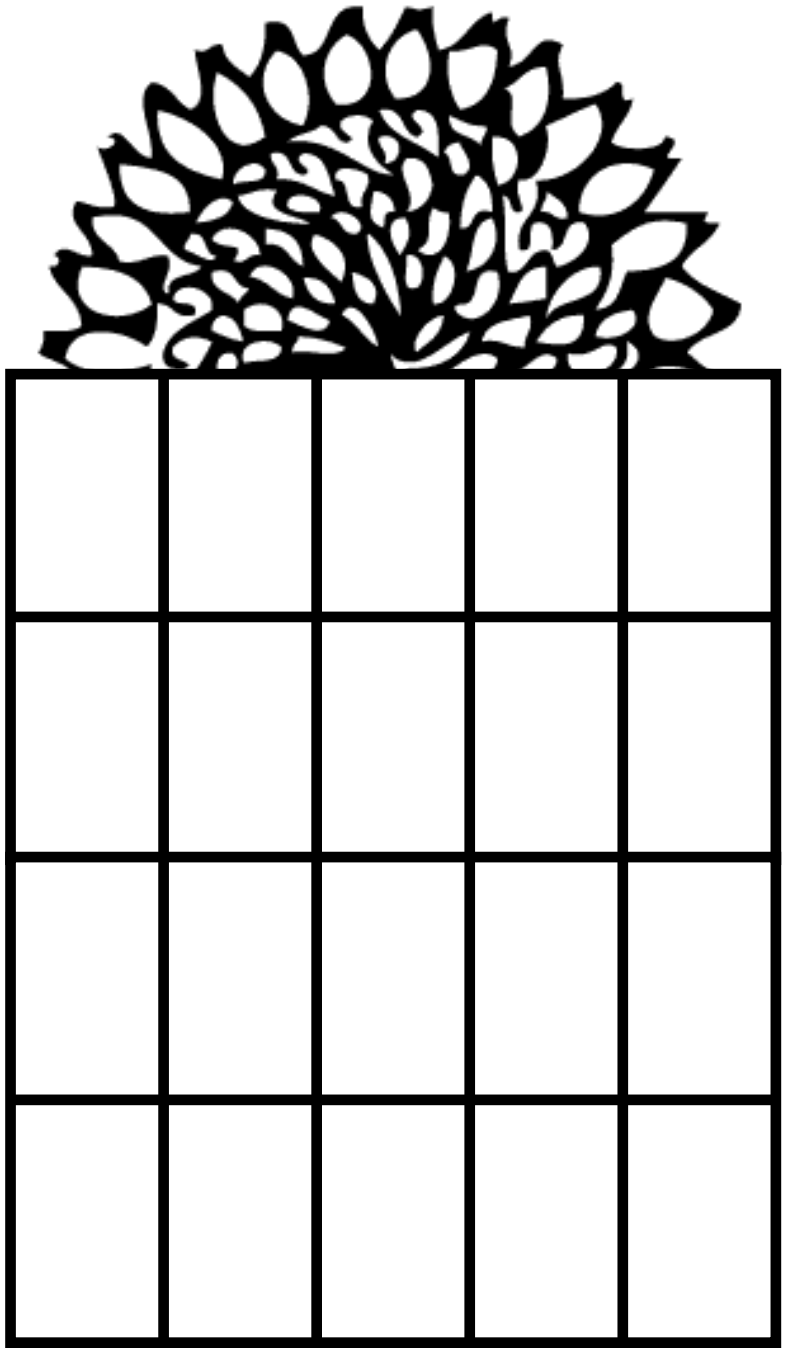
13

thirteen



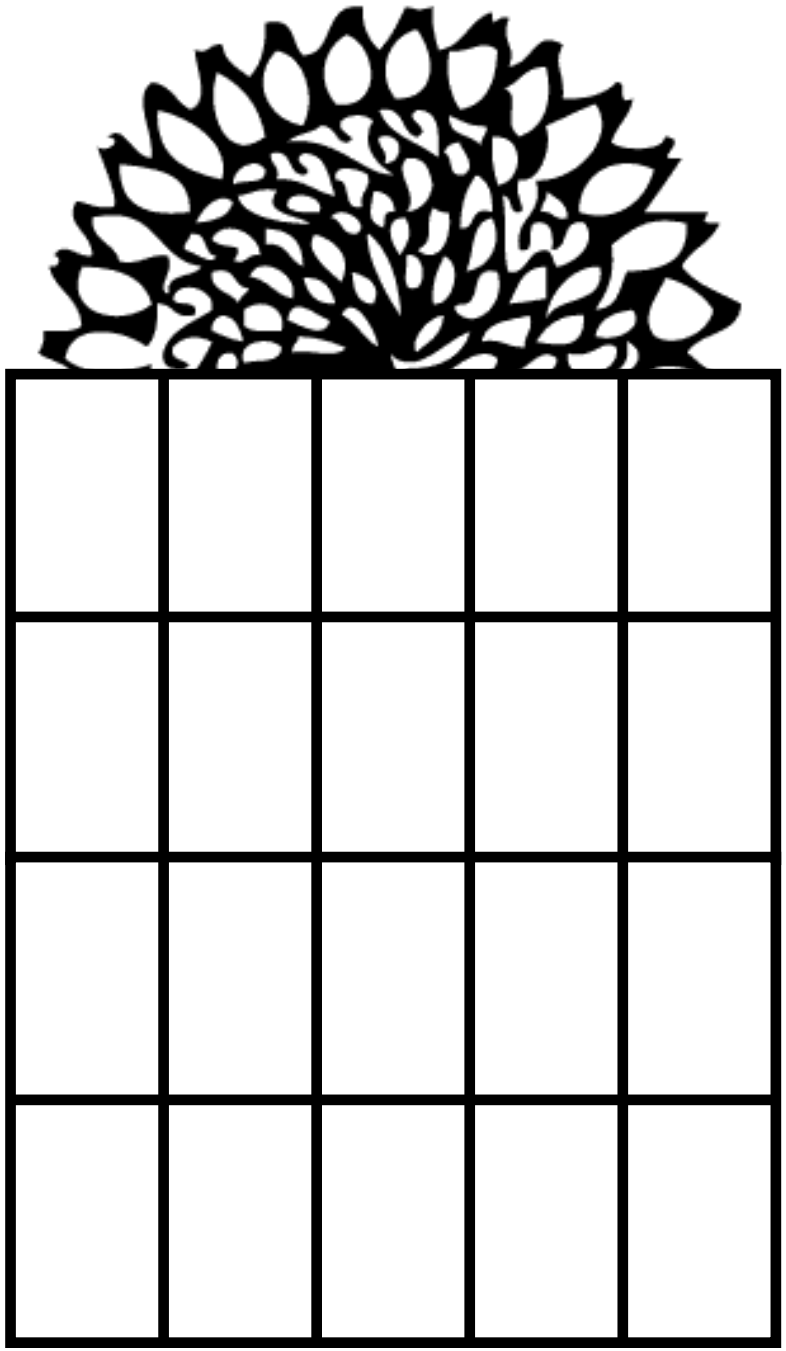
14

fourteen



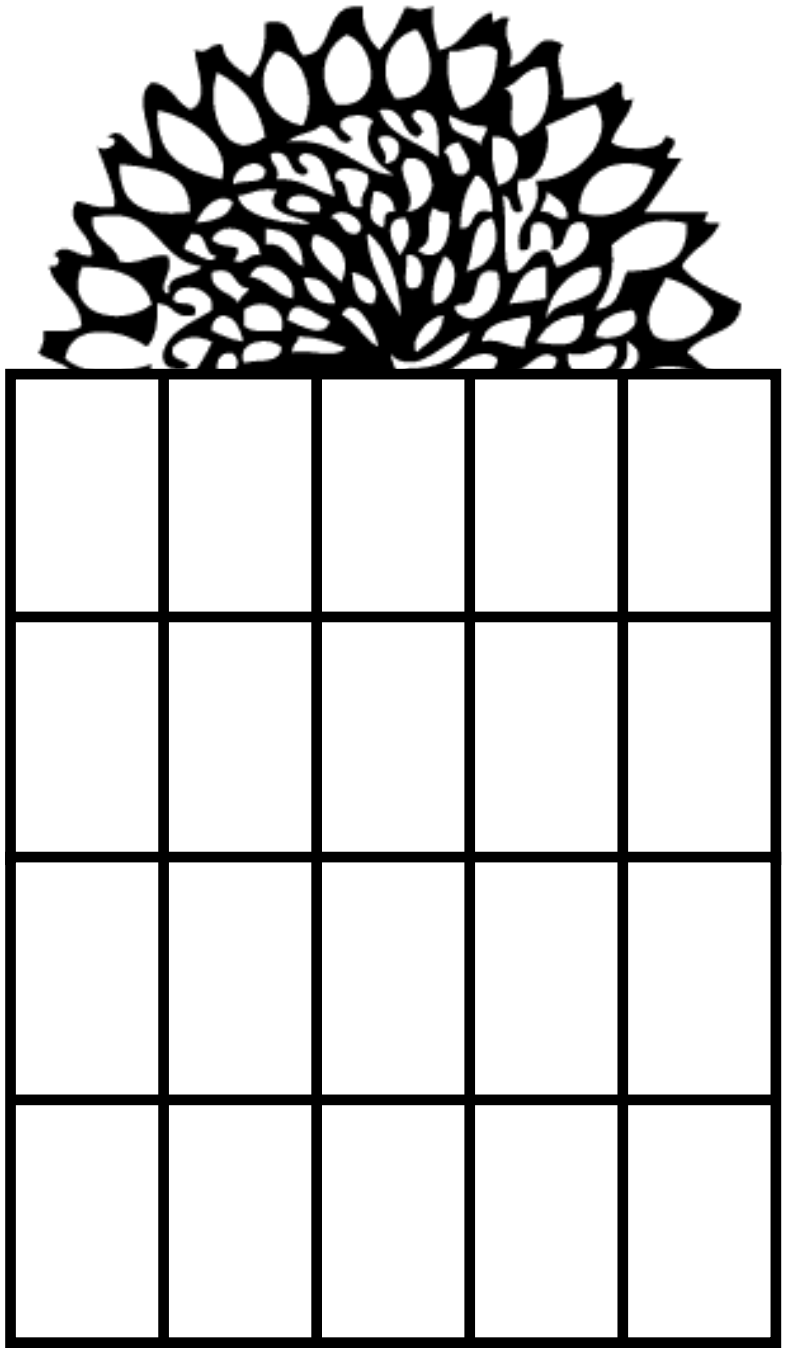
15

fifteen



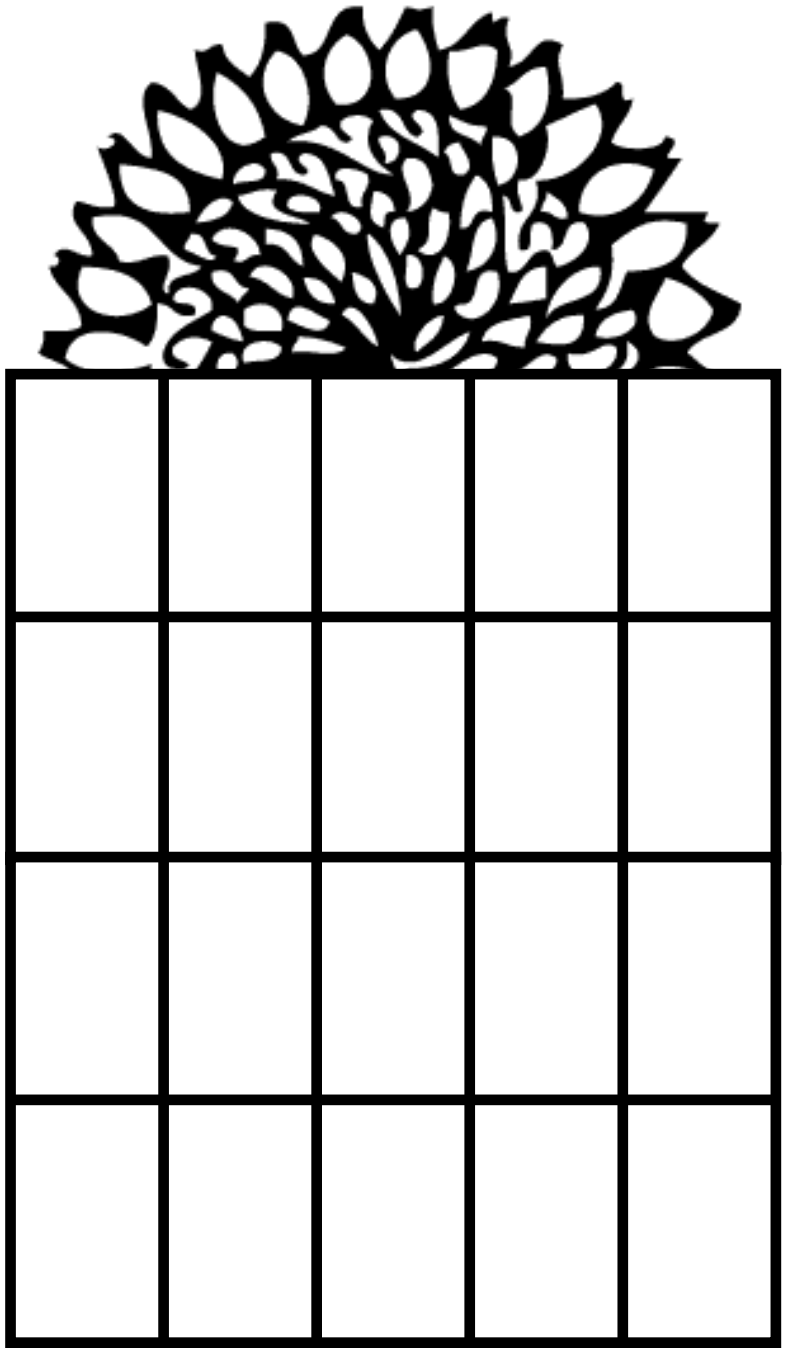
16

sixteen



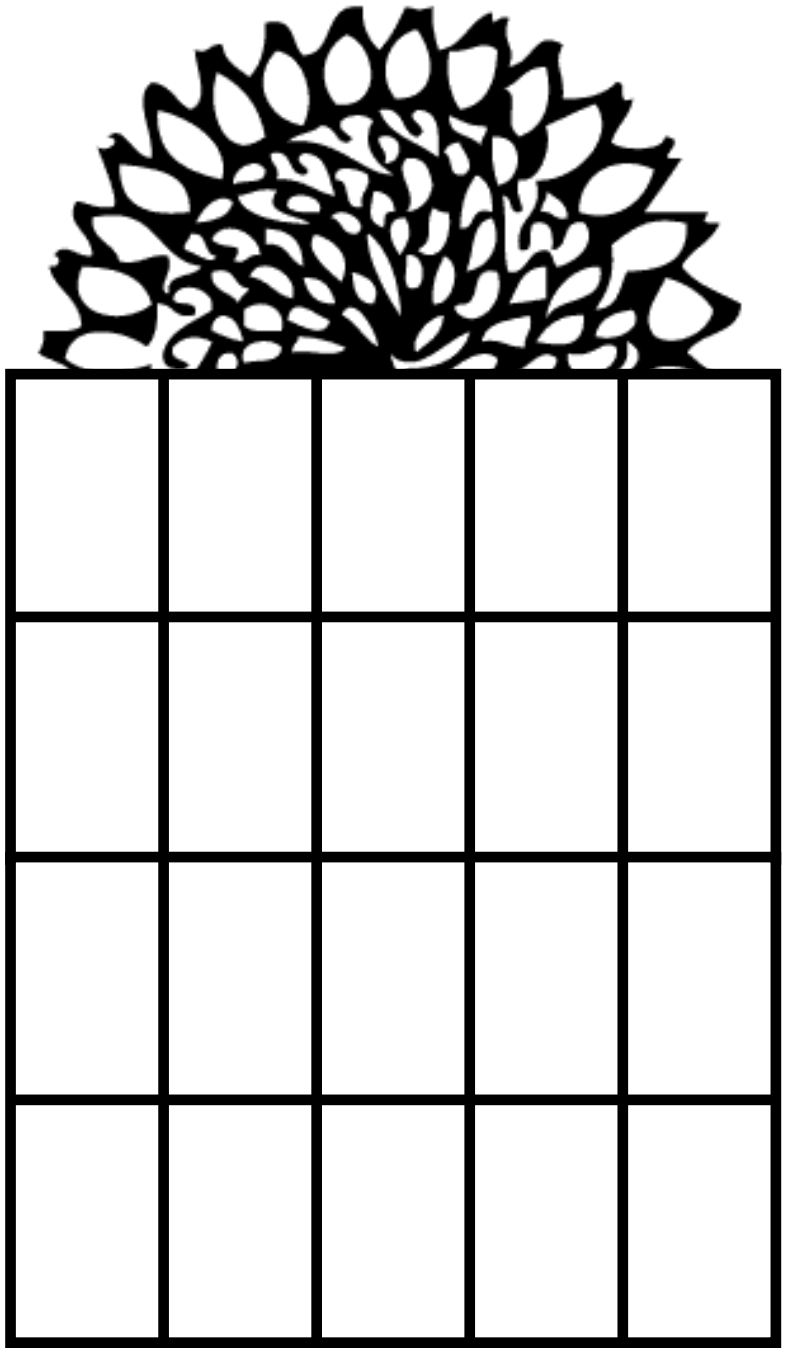
17

seventeen



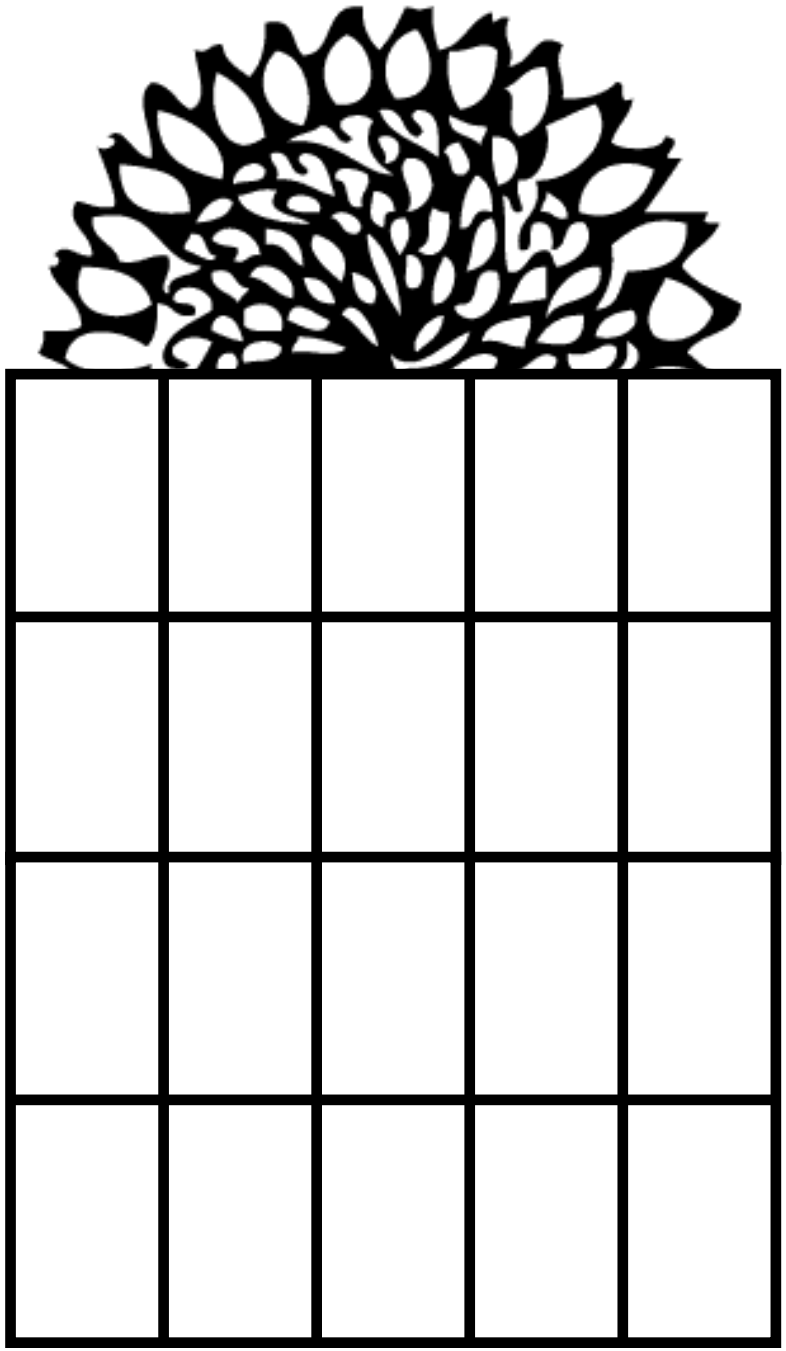
18

eighteen



19

nineteen



20

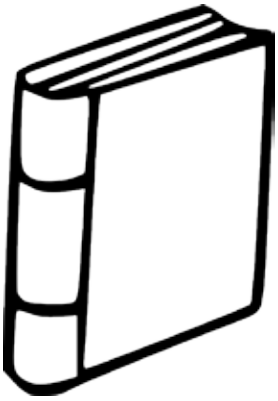
twenty

SUNFLOWER LAB

Is It a Plant Or Not a Plant?

Name _____

Circle the the things that are plants.
Mark an X through the things that are not plants.



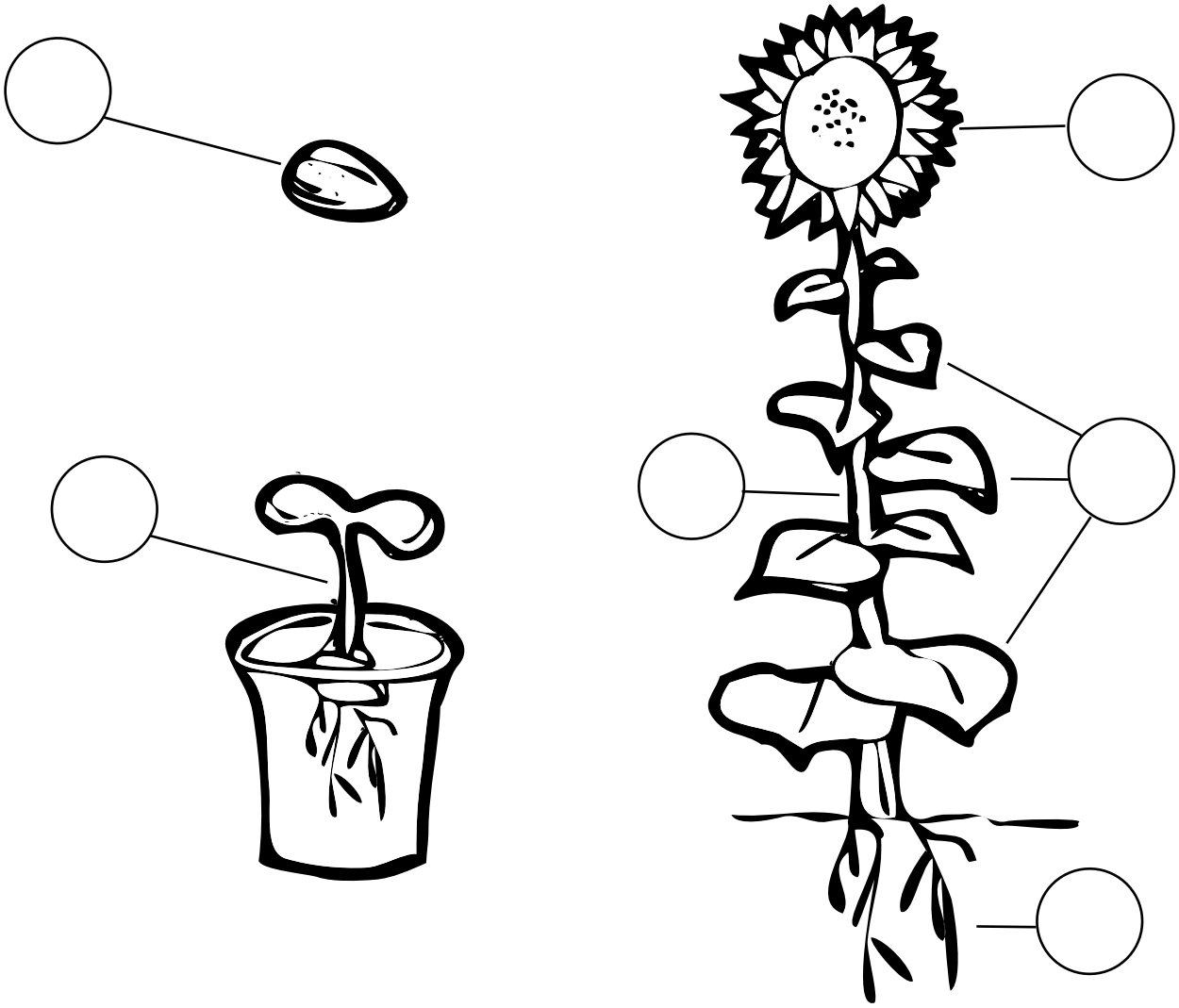
SUNFLOWER LAB

What Is a Plant?

Name _____

Match the words on this page to the correct parts of a plant.
Write the correct letter inside each circle.

A. leaves	B. roots	C. stem
D. flower	E. seed	F. sprout



What Does a Seed Need? Mini-Book

1. Print out the following page, one for each child.

2. In a small group, following your demonstration, have the students fold the page.

3. First, fold the page in half, bringing the top down to the bottom with the images showing on the outside.

4. Next, fold it in half again.
The front cover of the mini-book says, “What Does a Seed Need?”

5. In your small group, read the book together. Relate each word to each image. The students can repeat the story with you. Count the drops of rain. How many leaves does the sprout have? How many stripes does the seed have? Let the children tell a story that expands on the mini-book.

Have the students practice the story, so they can “read” their mini-book to their families.

6. Color your mini-book.

What Does a Seed Need?

Name _____

When a seed has

soil,

water,

and air,

it sprouts.

sunlight

SUNFLOWER LAB
Handprint Sunflower Art

Materials

- Yellow Paint
- Green Paint
- Sheet of Paper
- Glue
- Brown or Black Crayons

Pour yellow paint onto a plate, so the children can completely cover their hands in paint. Alternately, you can paint the hand with a wide paintbrush.

Near the top of the paper, trace the outline of a circle using bowl or lid, approximately 3-4 inches in diameter. Make 4-6 hand prints around the circle. Have the fingers pointing out to the edge of the paper.

Then add a sunflower stem and leaves using fingers dipped in green paint. Add green grass to the bottom of the paper.

Leave the paint to dry.

Cut a big circle from white paper to be the center of the sunflower. With brown and black crayons, completely crosshatch the circle. Glue the circle to the center of the flower.

SUNFLOWER LAB

Post Assessment

Repeat the assessment with your students and compare the pre assessment and post assessment for each student on the rubric.

SUNFLOWER LAB

Celebrate the Earth!

Each school celebrates the Earth's Birthday a little differently, bringing their own unique ideas and interests to the event. Get creative!

Many schools choose a day close to the end of the school year, when the weather's warm, to celebrate by planting seeds, releasing butterflies and demonstrating ways to care for our home planet.

Your celebration is a special gift from the children to the Earth!

Here are some activities for your classrooms to share:

- Sharing a song that students learned in the Sunflower Lab
- Planting seeds in a school garden
- Creating an art project from recycled materials
- Releasing Painted Lady butterflies
- Students draw pictures of their favorite animal
- Students reporting on ways to care for the earth like saving water, feeding birds, growing vegetables and more

At the close of your celebration, please remember to take the **Earth's Birthday Pledge**!

No job is too big,
No action too small
For the care of the Earth
Is the task of us all!

SUNFLOWER LAB

The Sunflower Challenge

Summer Take-Home

Overview

At the end of the school year, the students can take home a packet of sunflower seeds to plant in their yard or in a pot. Planting instructions are included. By reinforcing the sunflower experience, the students' science literacy will be reinforced over the summer. They will be able to share the experience of planting and caring for the plant with their families, as well as enjoy the beauty of sunflowers in late summer.

Each student will also take home a copy of *Every Seed Counts* to be read aloud several times. *Every Seed Counts* tells the story of the sunflower life cycle in words and pictures.

Each child receives:

- **packet of sunflower seeds**
- **planting instructions**
- **one copy of *Every Seed Counts***

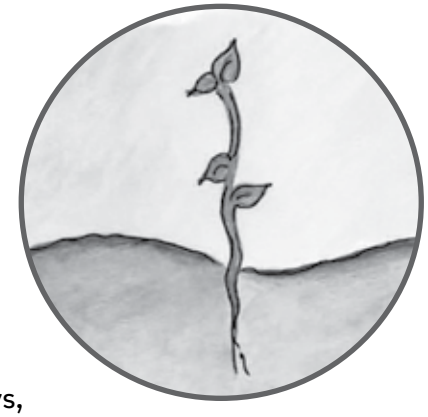
The Sunflower Challenge

GROW A SMALL ONE, GROW A TALL ONE. GROWING SUNFLOWERS IS EASY AND FUN!

Starting seeds and caring for plants as they sprout, grow and flower is great hands-on learning experience. In the classroom and at home, students will learn about the lifecycle of plants and then test themselves by participating in the Sunflower Challenge.

1. Learn about the lifecycle of plants.

Read *Every Seed Counts* with your class. Discuss the lifecycle of the sunflower, from seed to blooming plant and back to seed again. Can your students act out or draw the different stages of the sunflower plant? Try making a list of everything a seed needs to grow into a mature plant. Make copies of the counting activity at the back of the bookand see if your students can count the petals of the sunflower!

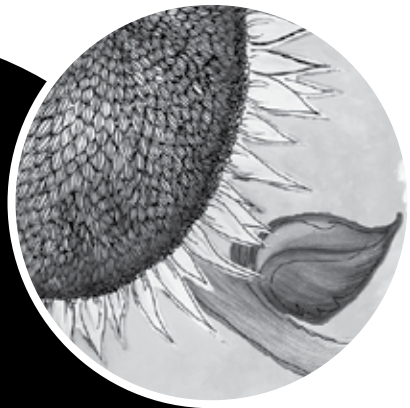


2. Sprout sunflower seeds in your classroom.

There's so much to learn about seeds. Open one or two packets for use by the classroom. Have students observe, describe and/or draw the sunflower seeds. Can your students predict what will happen when you plant the seeds? Let's see if they're right. Using seeds from the opened packets, start sprouting your sunflowers.

- Gather seed containers. You can use small paper cups, egg cartons, seed trays, seed plugs or small "cups" made from folded newspaper.
- Fill each one about 2/3 full with potting soil or seed starting mix. Place a seed in each cup. Push the seed down into the soil about 1/2 an inch and cover over. If you are using clear, plastic cups, place the seed at the side of the cup and push it down along the inside surface. You'll be able to watch roots and leaves develop right through the cup.
- Keep your seeds moist. Water them by using a spray bottle, mister or a watering can with a diffuser spout. A direct pour of water from a cup or can will cause the seed and soil to move around. Give them enough water to keep the soil moist but not so much that there is water standing at the bottom of the container.
- Place seed containers in a safe location where they can receive lots of light but won't be moved or knocked over very easily. Depending on the classroom temperature, your sunflowers should germinate (start to grow)and show their first leaves in just 3-10 days. Keep them happy, healthy and growing in your classroom until after the last frost date in your area. Then transplant them to a new home in the ground or a pot outside, where they can grow to their full height. Sunflowers do best in a sunny location, when temperatures are warm and days are long.

Find word puzzles, easy experiments and many more free, downloadable sunflower-related activities at our website **EarthsBirthday.org**



3. Take the Sunflower Challenge!

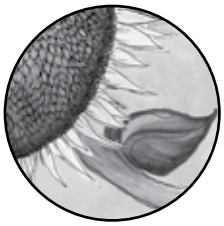
We challenge your students to use what they've learned about plants. Can they grow their own sunflowers from tiny seeds all the way to blooming plants? Send home a seed packet and A Note to Families (on reverse side of this sheet) with each child. Students that send in a picture of themselves with their home-grown sunflowers will receive a prize from our treasure trove of Earth-friendly gifts. How many Sunflower Challenge champions can your classroom can generate?

A Note to Families

Grow a small one, grow a tall one.
Growing sunflowers is
easy and fun.

Your child's class has been participating in the Earth Birthday Project's Sunflower Challenge! The challenge gives students a hands-on learning experience with the wonder of growing plants. Everything starts with the class reading of Every Seed Counts, a book about a sunflower's lifecycle from seed to bloom and back to seed again. Students learn what a plant needs to grow and how plants provide food for people and animals. Next, students sprout sunflower seedlings in their classroom. Now it's time to put all that wonderful learning into meeting our challenge: **Can your child grow his or her own sunflower from a seed to a blooming plant at home?** If the answer is "Yes!", simply send us a picture of your child with the grown sunflowers and we'll send back a prize from our treasure trove of Earth-friendly gifts!

Here's how to take the Sunflower Challenge:



- Open the packet of sunflower seeds. Before you plant the seeds, take a close look at them with your child. You might want to count their strips or arrange them in order from smallest to largest. What can your child tell you about growing sunflower seeds? Find lots of free, sunflower-related activities you can do at home on our website, EarthsBirthday.org.
- Plant sunflower seeds at home in your yard or in a big flower pot. Your child's classroom has already learned how to start seeds. Ask him/her how to do it!
- Care for sunflower plants as they sprout and grow. Remember that plants need sunlight, water and good soil for taking in nutrients.
- When your sunflowers are blooming, take a picture of your child with the flowers he/she has grown from tiny seeds. Send the photo, along with name and mailing address to **Earths Birthday Project, PO Box 1536, Santa Fe, NM 87504** or email a digital photo to **info@earthsbirthday.org**. *(Please note that we cannot return photographs.)*
- Two to four weeks later, check your mailbox. Earth's Birthday Project will mail a special surprise to everyone who sends in a photo. It's our way of saying **"Thank you!"** for growing and caring for these beautiful flowers and **"Great job!"** for successfully growing your sunflower from seed to bloom.

Earth's Birthday Project
Inspiring wonder, learning and care for our Earth
PO Box 1536 Santa Fe, NM 87504
EarthsBirthday.org info@EarthsBirthday.org
Toll Free: 800.698.4438

Take the Sunflower Challenge!