

# Outline for Student Book for Buds, Leaves and Global Warming Project

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St. Mary's Parish School

April 9, 2019

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- Some useful facts about trees
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- Spring Buds & Leaves Branch Sketch
- Spring data sheets
- Research questions

Church

Rectory

Apple  
Tree #5  
5A & 5B

Elementary School

Playscape

Parking Lot

Birch  
Tree #4  
4A, 4B, 4C & 4D

Cherry  
Tree #6  
6A, 6B & 6C

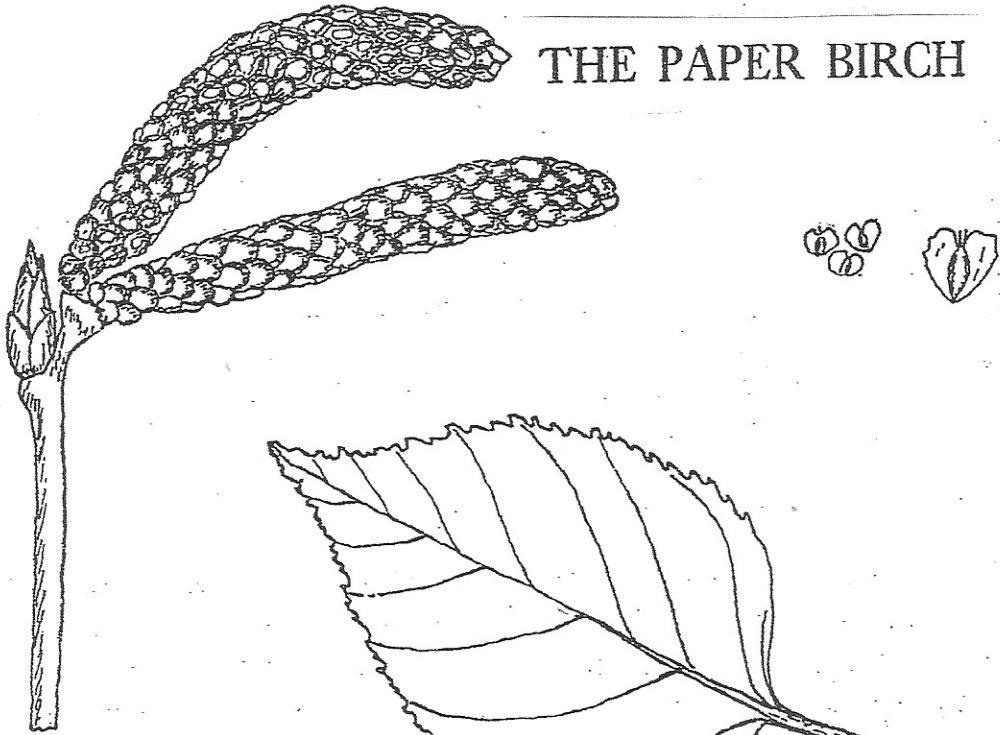
Elm  
Tree #1  
1A & 1B

Name: \_\_\_\_\_  
Partner: \_\_\_\_\_  
Tree Branch: \_\_\_\_\_

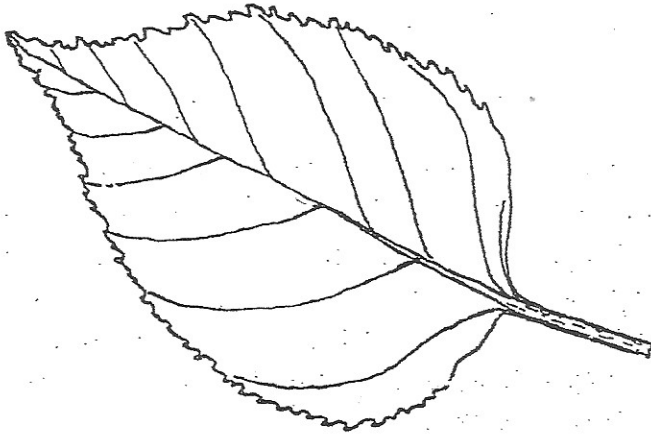
Name: \_\_\_\_\_

# Buds, Leaves and Global Warming

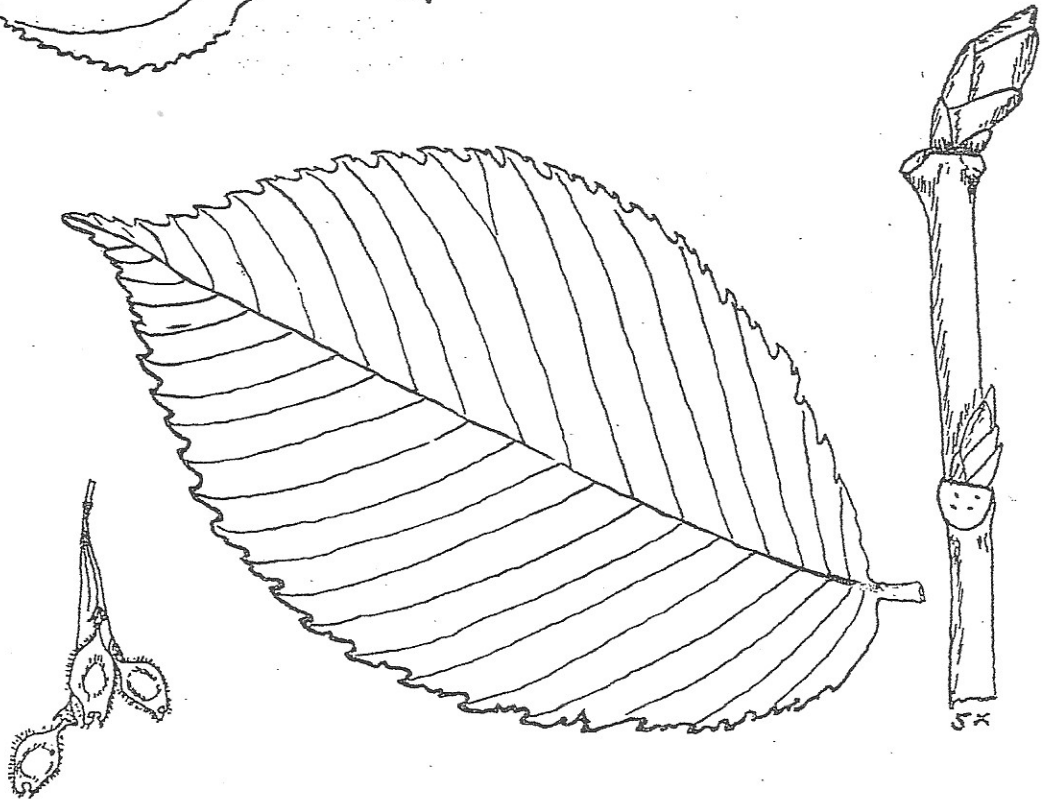
*These are the trees we will be observing:*

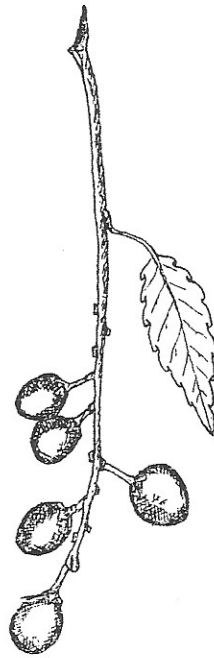
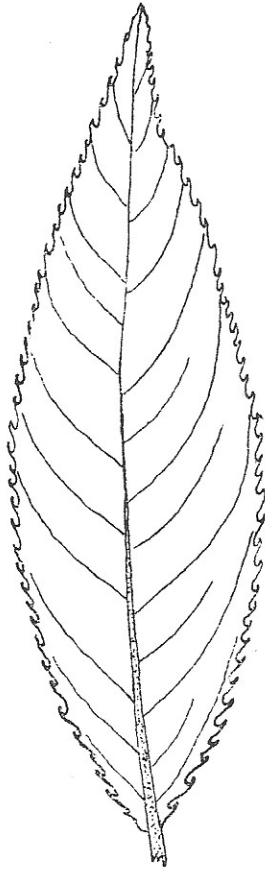


THE PAPER BIRCH

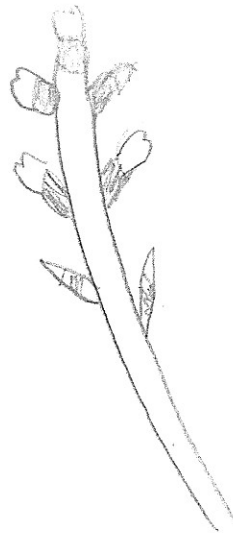
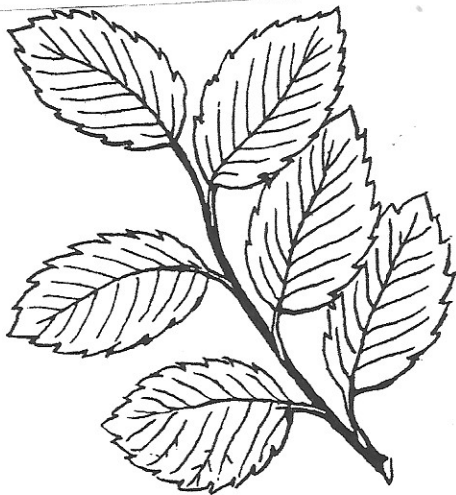


THE AMERICAN ELM





Cherry



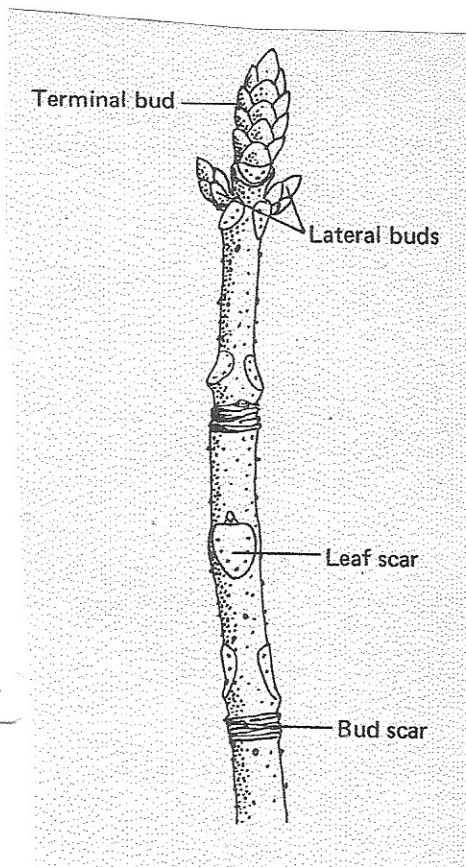
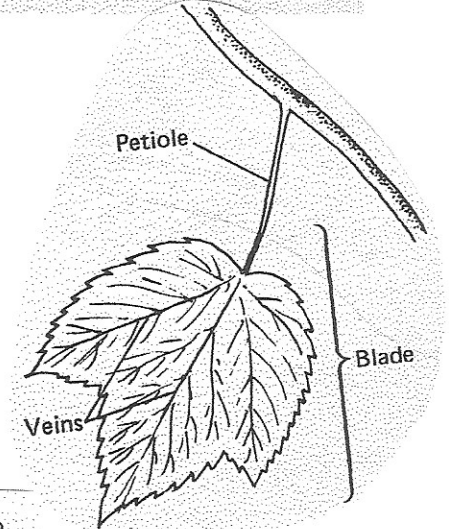
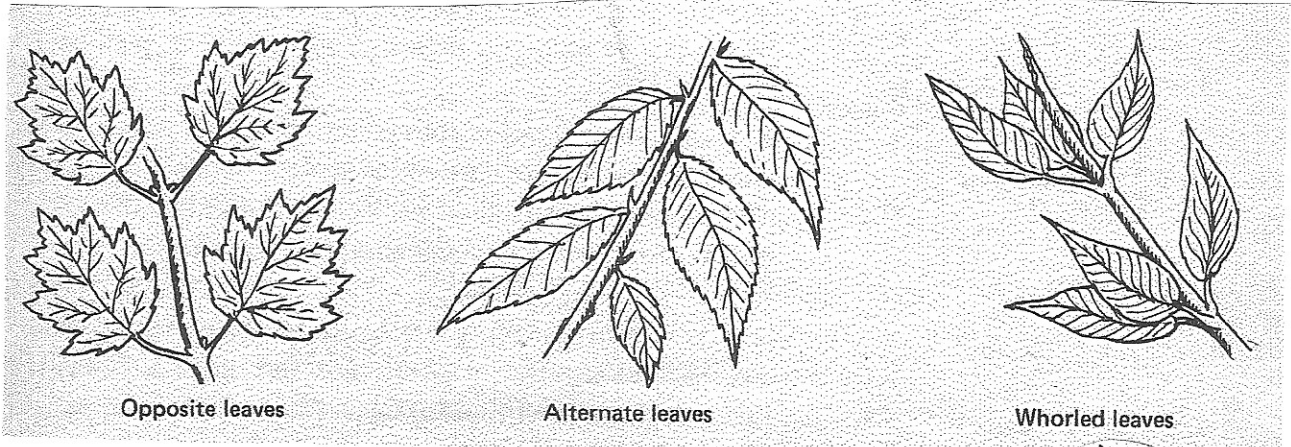
Apple



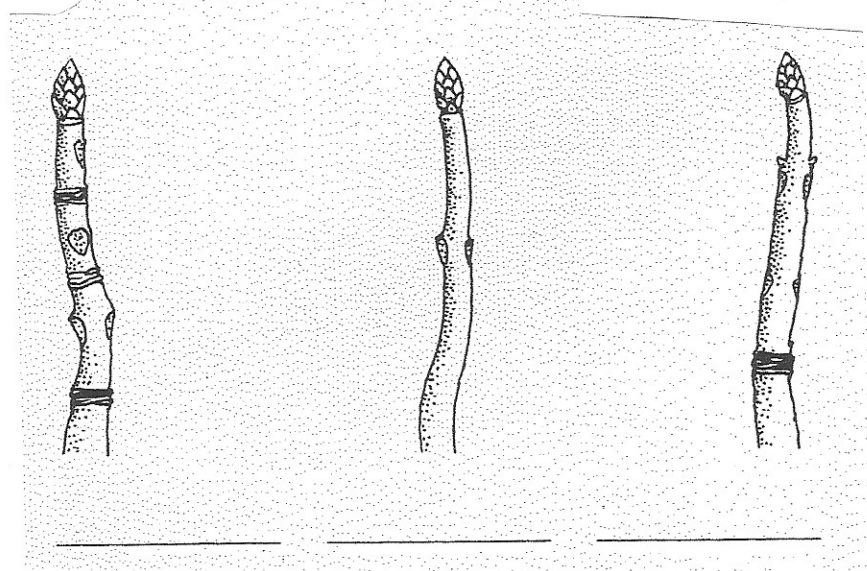
Name: \_\_\_\_\_

# Buds, Leaves and Global Warming

*Some useful facts about trees and leaves:*

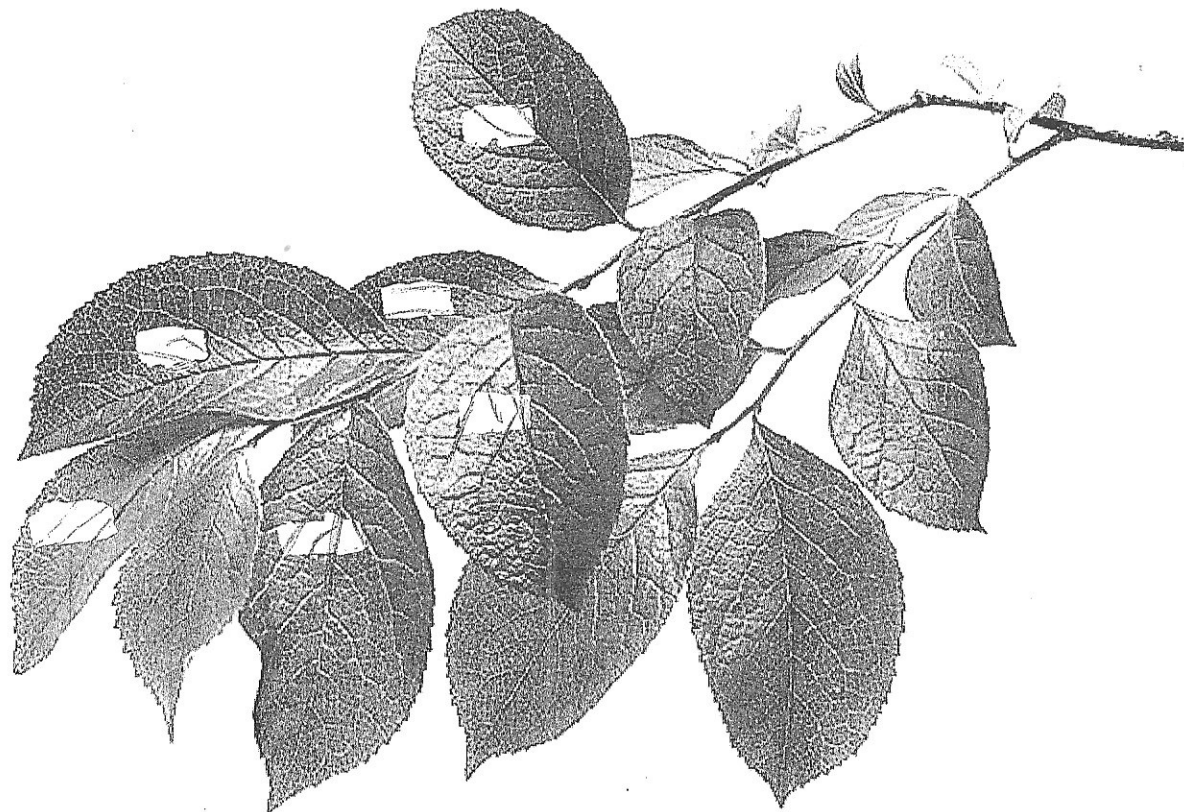


What are the ages of these twigs?



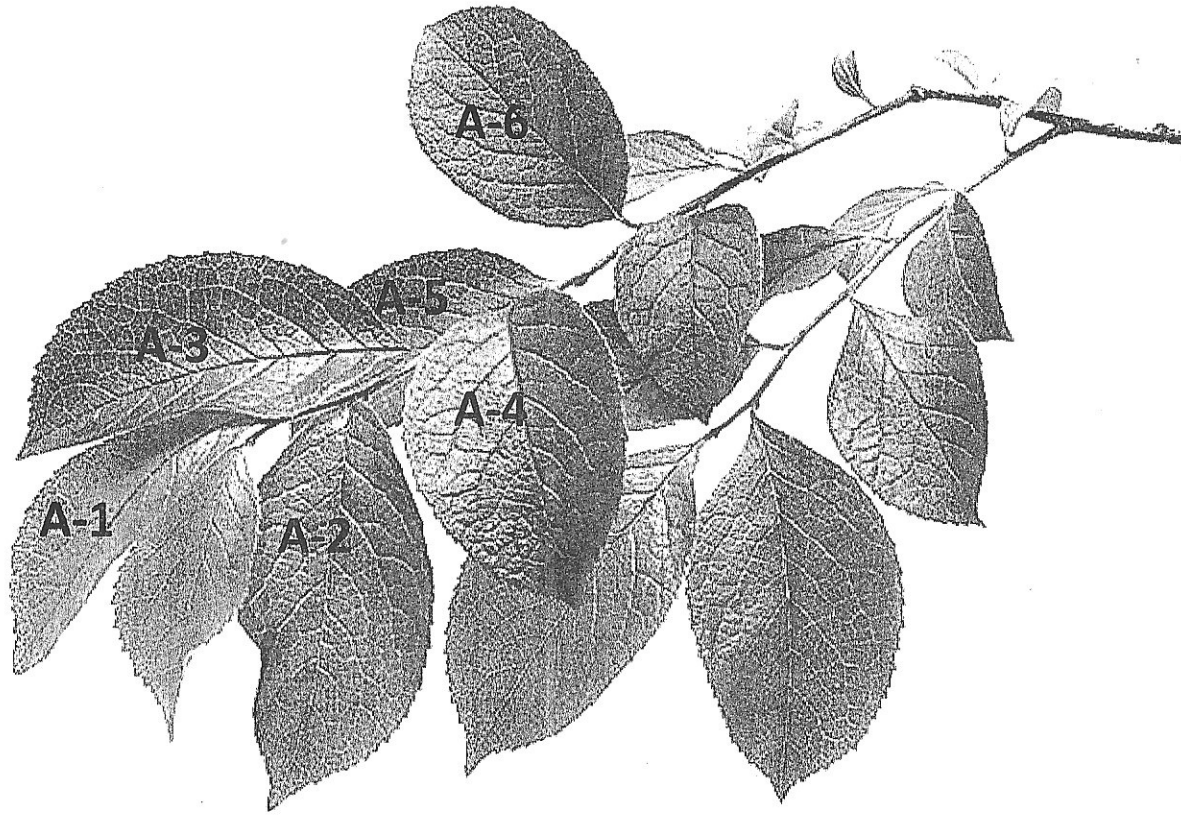
Name:

# Placing the label and counting leaves



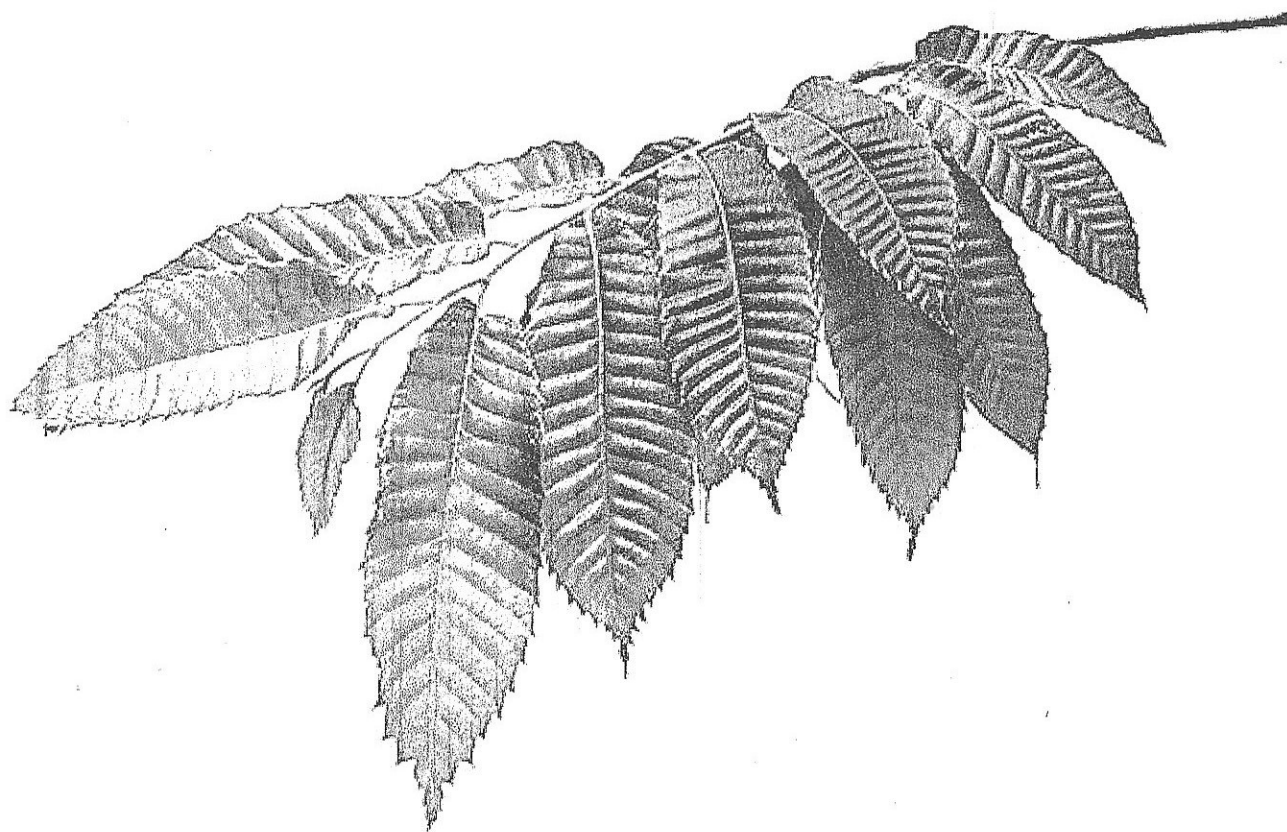
Name:

# Placing the label and counting leaves



Name:

# Practice # 2

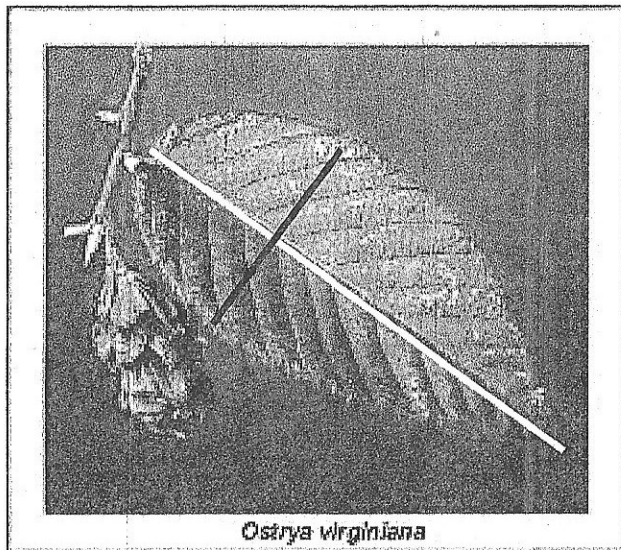
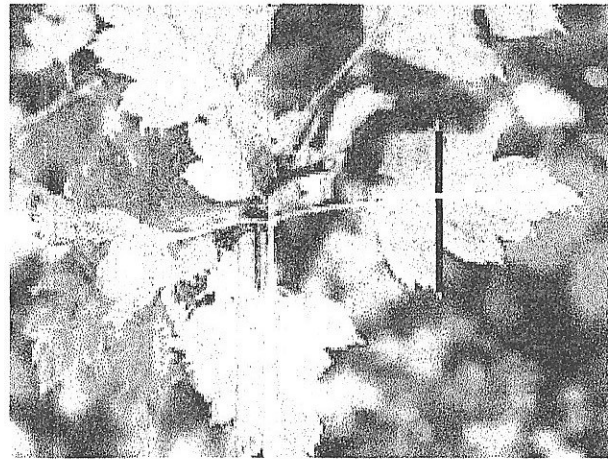
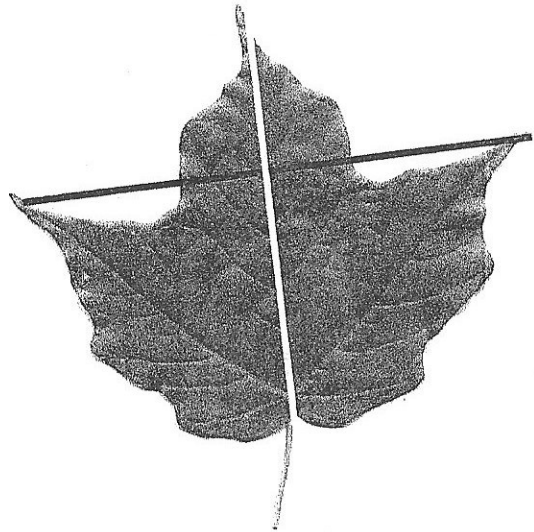


Name:

# Practice # 2



Name:



*Ostrya virginiana*





Harvard Forest Schoolyard Ecology  
Buds, Leaves, and Global Warming

## Autumn Student Data Sheet

March 2016

Name:  Date:

Teacher:  School:

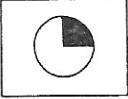



Tree Species:  Tree ID Number:

Total Number of Leaves Observed per branch:

Total Number of Leaves Fallen per branch:

**Teacher Note:** Remember that the branch totals above must be added with the branch totals from all branches of the same tree to get the total number of leaves dropped per tree to submit to Harvard Forest database.

### Fraction/ Percent Color Key

| Color Code | Fraction of Tree that has Changed Color  |
|------------|--|
| 1          | 0 - 25%<br> |
| 2          | 26-50%<br>  |
| 3          | 51-75%<br>  |
| 4          | 76-100%<br> |

**Whole Tree Color:** Look at the entire tree canopy and estimate how much of the tree has changed color.

Whole Tree Color Code:

**Individual Leaf Color:** What percent of each leaf on your study branch has changed color?

Leaf Color Codes:

| Leaf # | Color Code |
|--------|------------|
| 1      |            |
| 2      |            |
| 3      |            |
| 4      |            |
| 5      |            |
| 6      |            |

See Reverse for Leaf Measurement Table and Optional Field Notes...

**Leaf Length:** Measure Leaf Length only once in the beginning of the fall season

|                  | Leaf 1 | Leaf 2 | Leaf 3 | Leaf 4 | Leaf 5 | Leaf 6 |
|------------------|--------|--------|--------|--------|--------|--------|
| Leaf Length(cm.) |        |        |        |        |        |        |
| Leaf Width (cm.) |        |        |        |        |        |        |

**Teacher Note:** Leaf Length data will not be entered onto Harvard Forest Database. We recommend that students measure leaves in order to have an opportunity to practice measurement skills and to get a benchmark for leaf length that will serve as a guideline when leaf measurement is required in the spring protocol.

**Optional Field Notes:** Sometimes observations about weather, animal sign, or plant flowering times, herbaceous plant presence, etc. are helpful in understanding phenology and/or natural areas more fully. If you have time, jot down some field notes here.

**Weather Notes:**

**Animal Notes:**

**Plant Notes:**

**Other:**



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

Buds, Leaves & Global Warming  
Winter Observation

Draw a detailed sketch of your branch with the new buds on it.

Write a descriptive observation sentence(s) about your branch and its buds.

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

### Buds and Leaves Mystery Game

Write the letter of the branch next to the name of the tree it came from.

Cherry \_\_\_\_\_

Apple \_\_\_\_\_

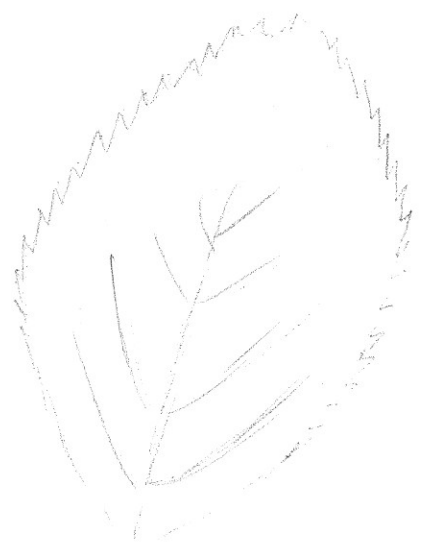
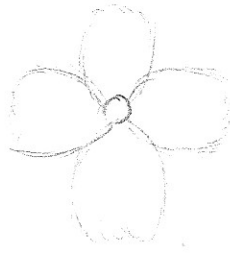
Birch \_\_\_\_\_

Forsythia \_\_\_\_\_

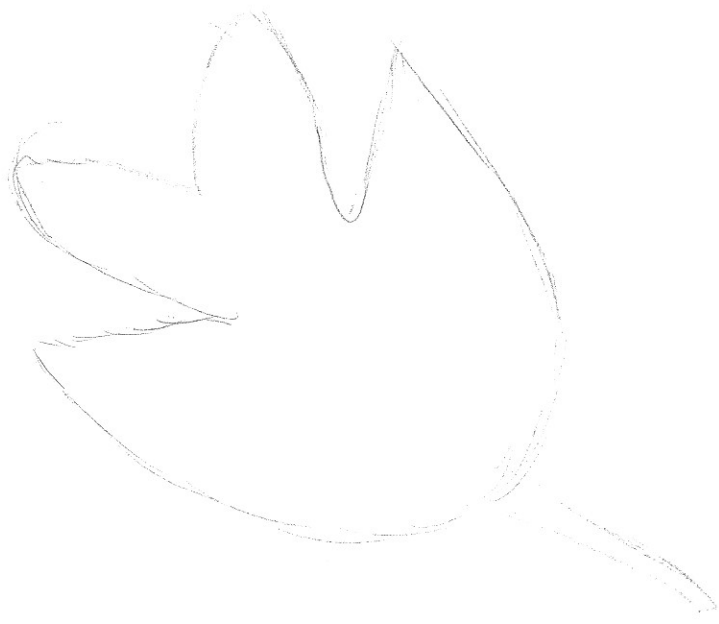
Elm \_\_\_\_\_

Tulip \_\_\_\_\_

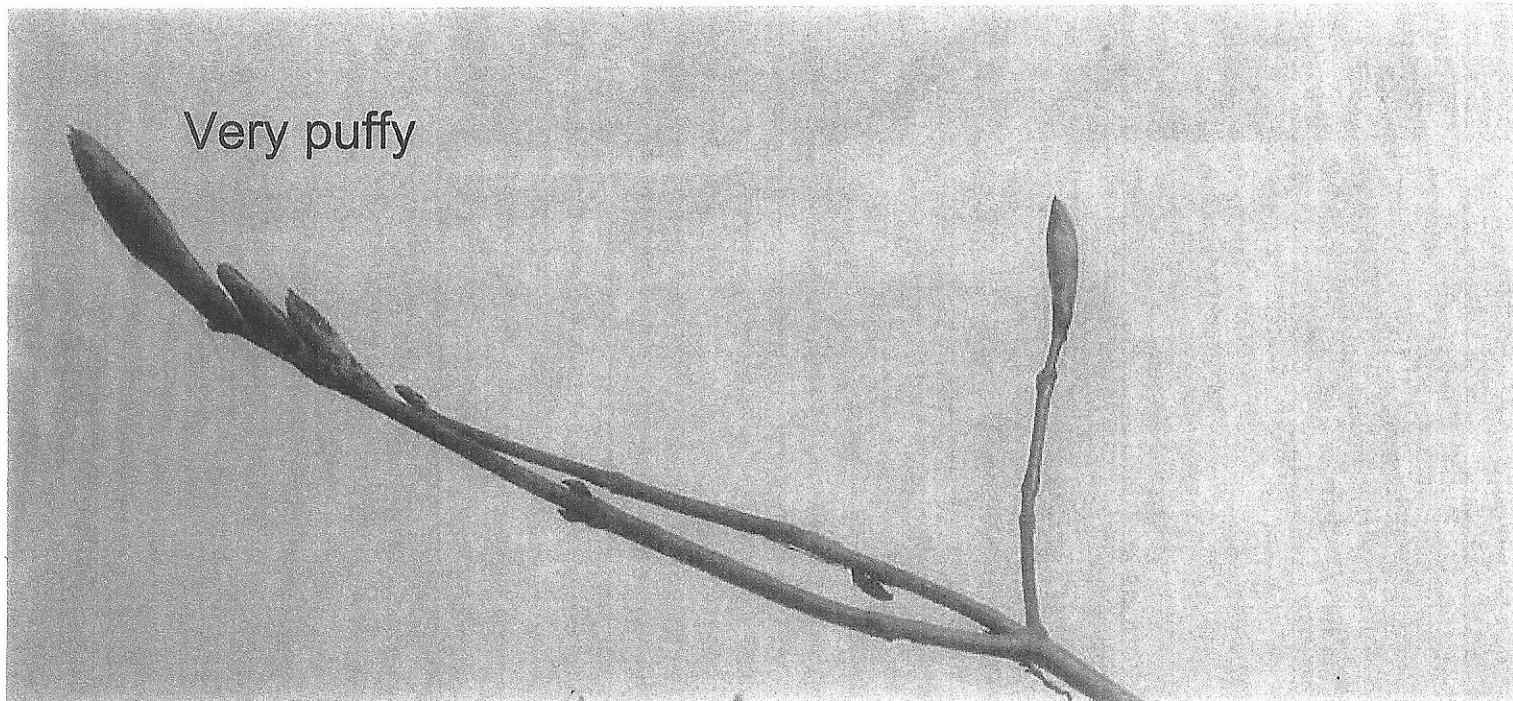
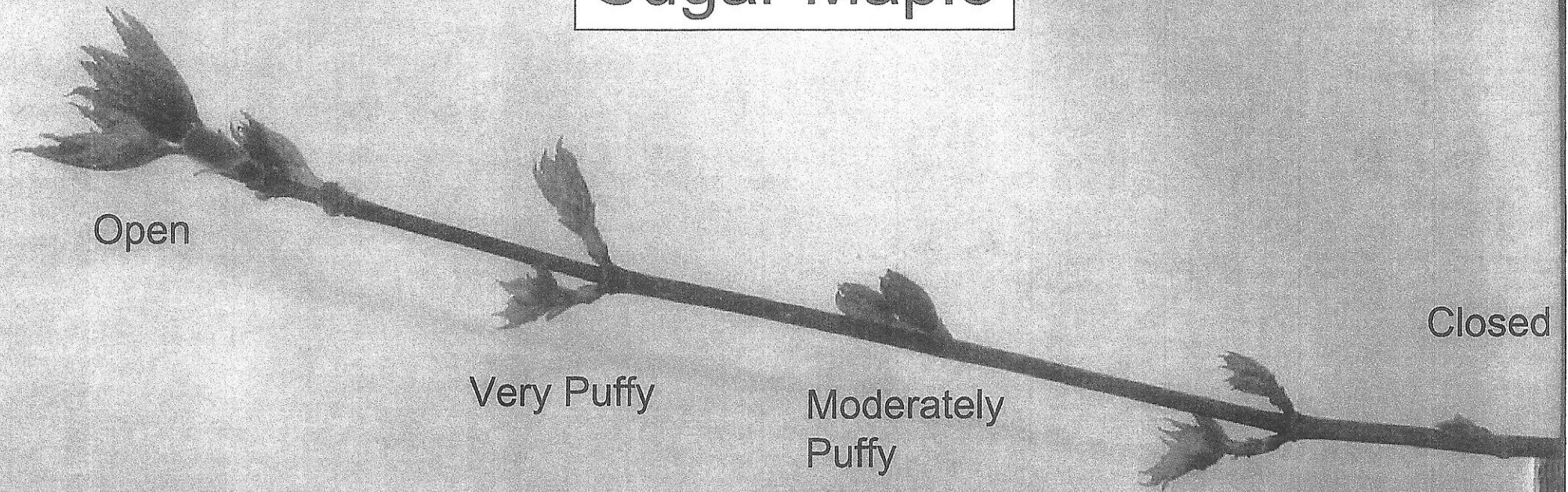
Forsythia



Tulip



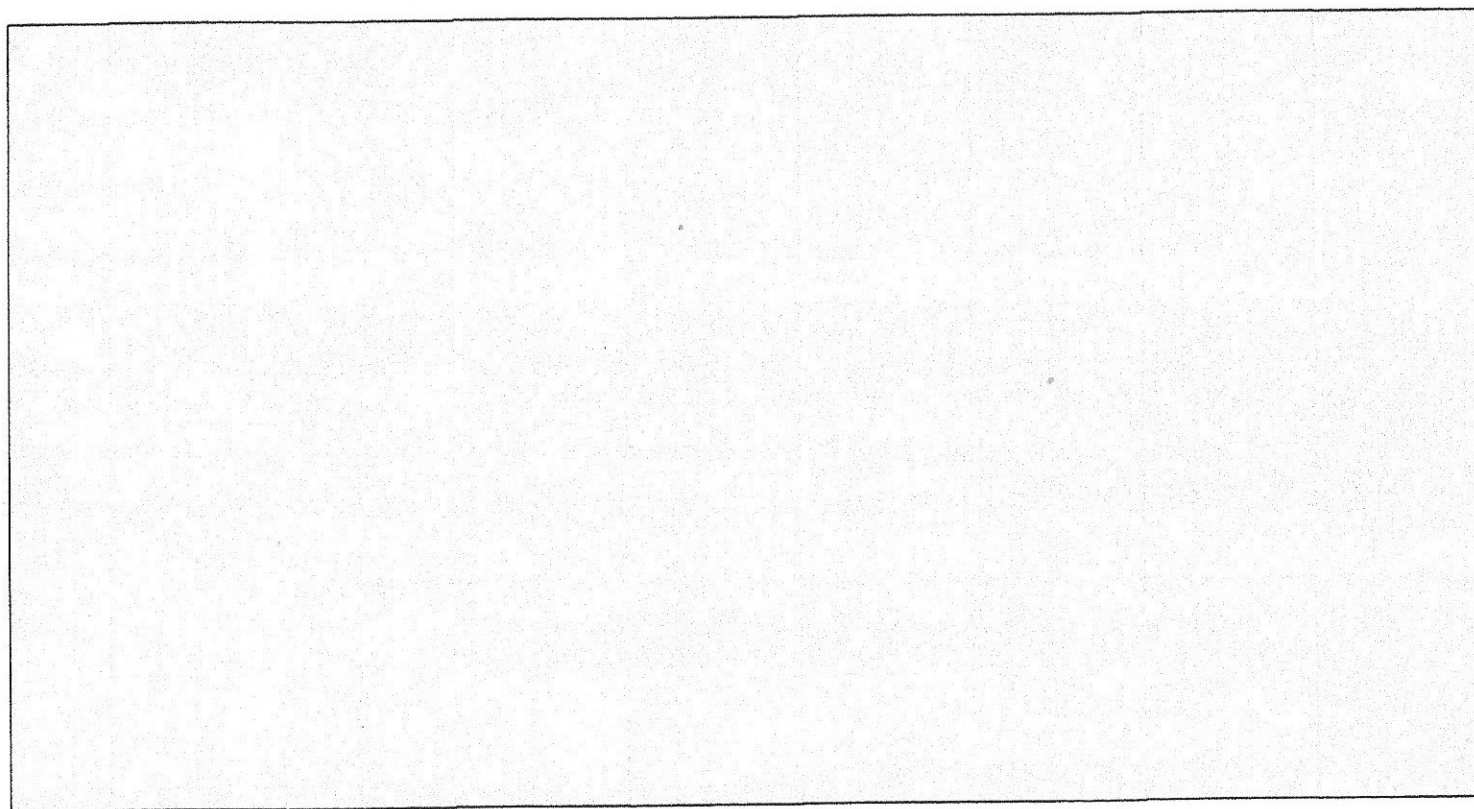
# Sugar Maple



Name \_\_\_\_\_ Date \_\_\_\_\_

### Spring Buds & Leaves Branch Sketch

Sketch your branch as it appears now. Be sure to show each of your six buds.  
Use the whole box for your sketch.



What do you notice about your buds? \_\_\_\_\_  
\_\_\_\_\_



Harvard Forest LTER Schoolyard Program  
Buds, Leaves and Global Warming

**Student Data Sheet – Spring**

Revised March 2010 by JOK and PS

Names: \_\_\_\_\_  
 School: \_\_\_\_\_ Date: \_\_\_\_\_  
 Tree Species: \_\_\_\_\_  
 Tree ID (number): \_\_\_\_\_ Branch ID (letter): \_\_\_\_\_

1. Put a check mark in the correct column below to show the stage of each bud.

|  | Bud 1 | Bud 2 | Bud 3 | Bud 4 | Bud 5 | Bud 6 |
|--|-------|-------|-------|-------|-------|-------|
| <b>Closed:</b> Bud is closed and not puffy                       |       |       |       |       |       |       |
| <b>Puffy:</b> Bud is swollen or opening with no unfolded leaf    |       |       |       |       |       |       |
| <b>Open:</b> Bud has opened and whole leaf is visible (budburst) |       |       |       |       |       |       |
| <b>Bud Fallen Off</b>  |       |       |       |       |       |       |

2. How many buds were observed in all? \_\_\_\_\_  
 Of these, how many were Closed? \_\_\_\_\_ Puffy? \_\_\_\_\_ Open? \_\_\_\_\_

3. Look for the open bud with the largest leaf.  
 Measure the leaf length in centimeters: \_\_\_\_\_

4. Field notes:

Temperature (degrees Celsius): \_\_\_\_\_

Humidity(%): \_\_\_\_\_

Circle one: Sunny Cloudy Rainy

Other observations and Notes: \_\_\_\_\_

**Teacher Note:** Please combine data from all branches on the same tree to create tree-level data for submission to Harvard Forest.



Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Buds, Leaves and Global Warming Research Questions

**Question #1:** How long is the growing season in our schoolyard?

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### Julian Date Calendar

| Day | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1   | 1   | 32  | 60  | 91  | 121 | 152 | 182 | 213 | 244 | 274 | 305 | 335 |
| 2   | 2   | 33  | 61  | 92  | 122 | 153 | 183 | 214 | 245 | 275 | 306 | 336 |
| 3   | 3   | 34  | 62  | 93  | 123 | 154 | 184 | 215 | 246 | 276 | 307 | 337 |
| 4   | 4   | 35  | 63  | 94  | 124 | 155 | 185 | 216 | 247 | 277 | 308 | 338 |
| 5   | 5   | 36  | 64  | 95  | 125 | 156 | 186 | 217 | 248 | 278 | 309 | 339 |
| 6   | 6   | 37  | 65  | 96  | 126 | 157 | 187 | 218 | 249 | 279 | 310 | 340 |
| 7   | 7   | 38  | 66  | 97  | 127 | 158 | 188 | 219 | 250 | 280 | 311 | 341 |
| 8   | 8   | 39  | 67  | 98  | 128 | 159 | 189 | 220 | 251 | 281 | 312 | 342 |
| 9   | 9   | 40  | 68  | 99  | 129 | 160 | 190 | 221 | 252 | 282 | 313 | 343 |
| 10  | 10  | 41  | 69  | 100 | 130 | 161 | 191 | 222 | 253 | 283 | 314 | 344 |
| 11  | 11  | 42  | 70  | 101 | 131 | 162 | 192 | 223 | 254 | 284 | 315 | 345 |
| 12  | 12  | 43  | 71  | 102 | 132 | 163 | 193 | 224 | 255 | 285 | 316 | 346 |
| 13  | 13  | 44  | 72  | 103 | 133 | 164 | 194 | 225 | 256 | 286 | 317 | 347 |
| 14  | 14  | 45  | 73  | 104 | 134 | 165 | 195 | 226 | 257 | 287 | 318 | 348 |
| 15  | 15  | 46  | 74  | 105 | 135 | 166 | 196 | 227 | 258 | 288 | 319 | 349 |
| 16  | 16  | 47  | 75  | 106 | 136 | 167 | 197 | 228 | 259 | 289 | 320 | 350 |
| 17  | 17  | 48  | 76  | 107 | 137 | 168 | 198 | 229 | 260 | 290 | 321 | 351 |
| 18  | 18  | 49  | 77  | 108 | 138 | 169 | 199 | 230 | 261 | 291 | 322 | 352 |
| 19  | 19  | 50  | 78  | 109 | 139 | 170 | 200 | 231 | 262 | 292 | 323 | 353 |
| 20  | 20  | 51  | 79  | 110 | 140 | 171 | 201 | 232 | 263 | 293 | 324 | 354 |
| 21  | 21  | 52  | 80  | 111 | 141 | 172 | 202 | 233 | 264 | 294 | 325 | 355 |
| 22  | 22  | 53  | 81  | 112 | 142 | 173 | 203 | 234 | 265 | 295 | 326 | 356 |
| 23  | 23  | 54  | 82  | 113 | 143 | 174 | 204 | 235 | 266 | 296 | 327 | 357 |
| 24  | 24  | 55  | 83  | 114 | 144 | 175 | 205 | 236 | 267 | 297 | 328 | 358 |
| 25  | 25  | 56  | 84  | 115 | 145 | 176 | 206 | 237 | 268 | 298 | 329 | 359 |
| 26  | 26  | 57  | 85  | 116 | 146 | 177 | 207 | 238 | 269 | 299 | 330 | 360 |
| 27  | 27  | 58  | 86  | 117 | 147 | 178 | 208 | 239 | 270 | 300 | 331 | 361 |
| 28  | 28  | 59  | 87  | 118 | 148 | 179 | 209 | 240 | 271 | 301 | 332 | 362 |
| 29  | 29  |     | 88  | 119 | 149 | 180 | 210 | 241 | 272 | 302 | 333 | 363 |
| 30  | 30  |     | 89  | 120 | 150 | 181 | 211 | 242 | 273 | 303 | 334 | 364 |
| 31  | 31  |     | 90  |     | 151 |     | 212 | 243 |     | 304 |     | 365 |



**Question #2:** How is the length of the growing season related to climate?

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