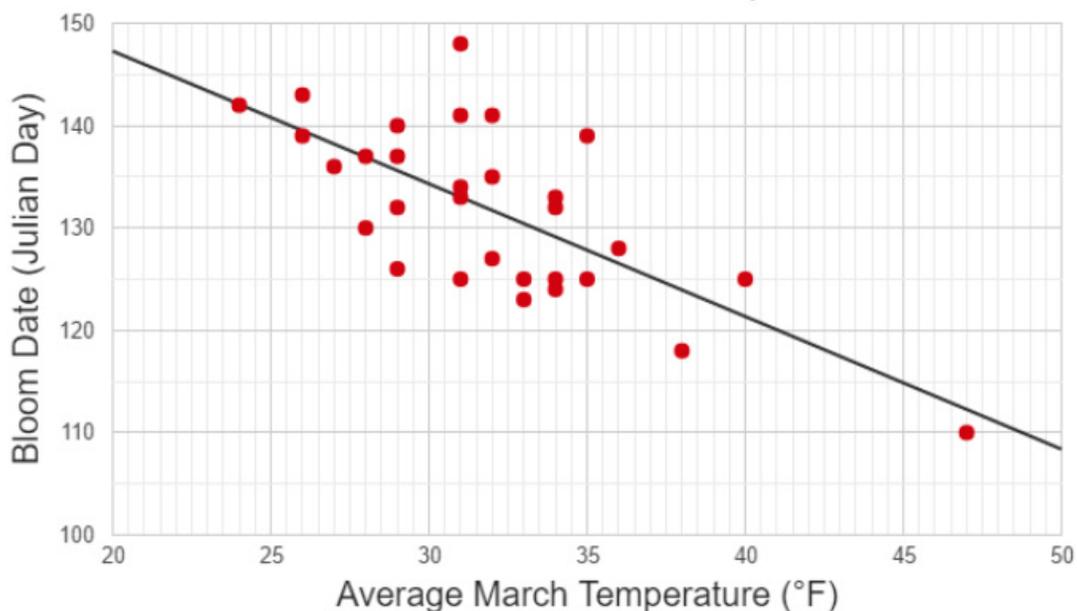# Climate Change and the Future of Michigan Cherries:
- Lesson 2 Worksheet & Homework -

1. **Estimate the line of best fit (using a straightedge) on the graph below.** Answer may vary.

2. **Using another color pen or pencil, add the actual line of best fit.** See slide 32

Blooming Date of Tart Cherries in Michigan as a function of March Temperature

3. **What does this graph and the line of best fit equation tell us about the relationship between the variables Average March Temperature and Bloom Date?**

   When Average March Temperature is low, Bloom Date is later (higher). And when Average March Temperature is high, Bloom Date occurs earlier (lower).

4. **Estimate the average date of bloom according to the graph. (Approximately what day to cherries seem to bloom most often?)**

   Julian Day 131 or 132, so approximately May 12

5. **What is the equation for the line of best fit for our graph?**

   $(\underline{y}) = (\underline{m})(\underline{x}) + (\underline{b})$

6. **What does each part of the equation mean in general and in this context?**

   - X is the x-value of a point on the line; the temperature in degrees Fahrenheit; This is the independent variable

   - Y is the y value of a point on the line; the date of full bloom, this is the dependent variable

   - M - specifically, for every degree warmer, how many days earlier do the cherries bloom?
     m is the slope (rise over run, the change in y over change in x). For every degree warmer, cherry trees bloomed 1.3 days earlier.

   - B - If there was an Avg. March temperature of 0 degrees, what day would the cherries bloom according to our model? How different is this than the average date of bloom (located on your data table)?
     b is the y-intercept (the y value when x=0).
     If avg. March temperature= 0 degrees, cherries would bloom on Day 173.22 (or June 21st).

7. **Use the line of best fit and its equation to predict the Bloom Date if Avg.March temp. Is: (include both Julian Day format and actual data, e.g. May 12.)**

   - 0 degrees: 173 = June 21
   - 25 degrees: 140/141 = May 19/20
   - 30 degrees: 134 = May 13
   - 45 degrees: 114/ 115 = April 23/24

HOMEWORK

1. **What impact may early or late bloom dates have on cherry farmers and the larger population?**

   Student answers may vary. Students may mention frost, loss of crop, growing season, loss of income for farmers, expense of purchasing cherries, availability of cherries to population, influence on other products

2. **Reflect on the strengths and limitations of your graph. What can it help farmers with? What doesn't the graph do? How could you make it more accurate?**

   Student ideas may vary. Details re. Strengths & Limitations found on Slide 45.
   Adding more data would make the graph more accurate (additional years, See Slide 46+ for practice). Students may also mention adding in more information or variables.