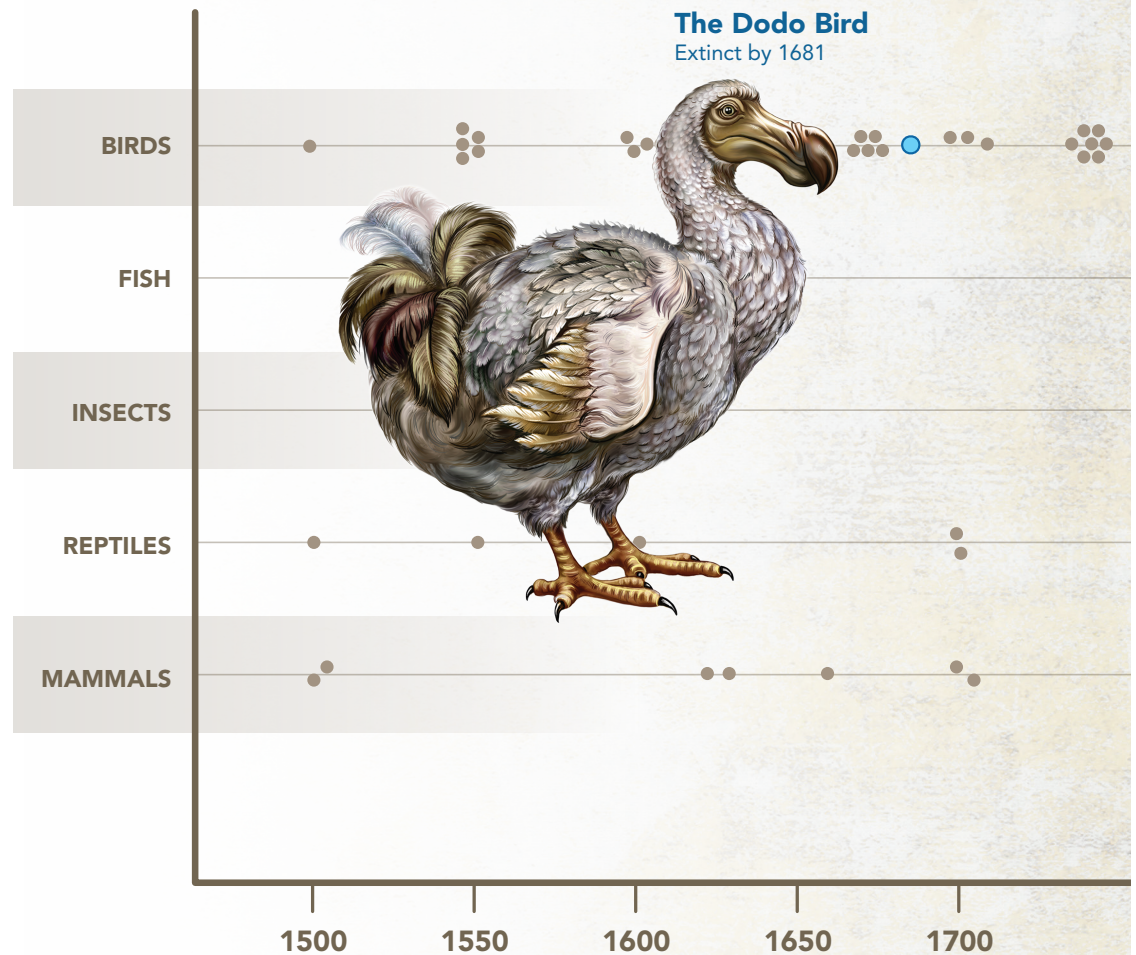


Integrate
Data Science
**Investigate
Endangered
Species**

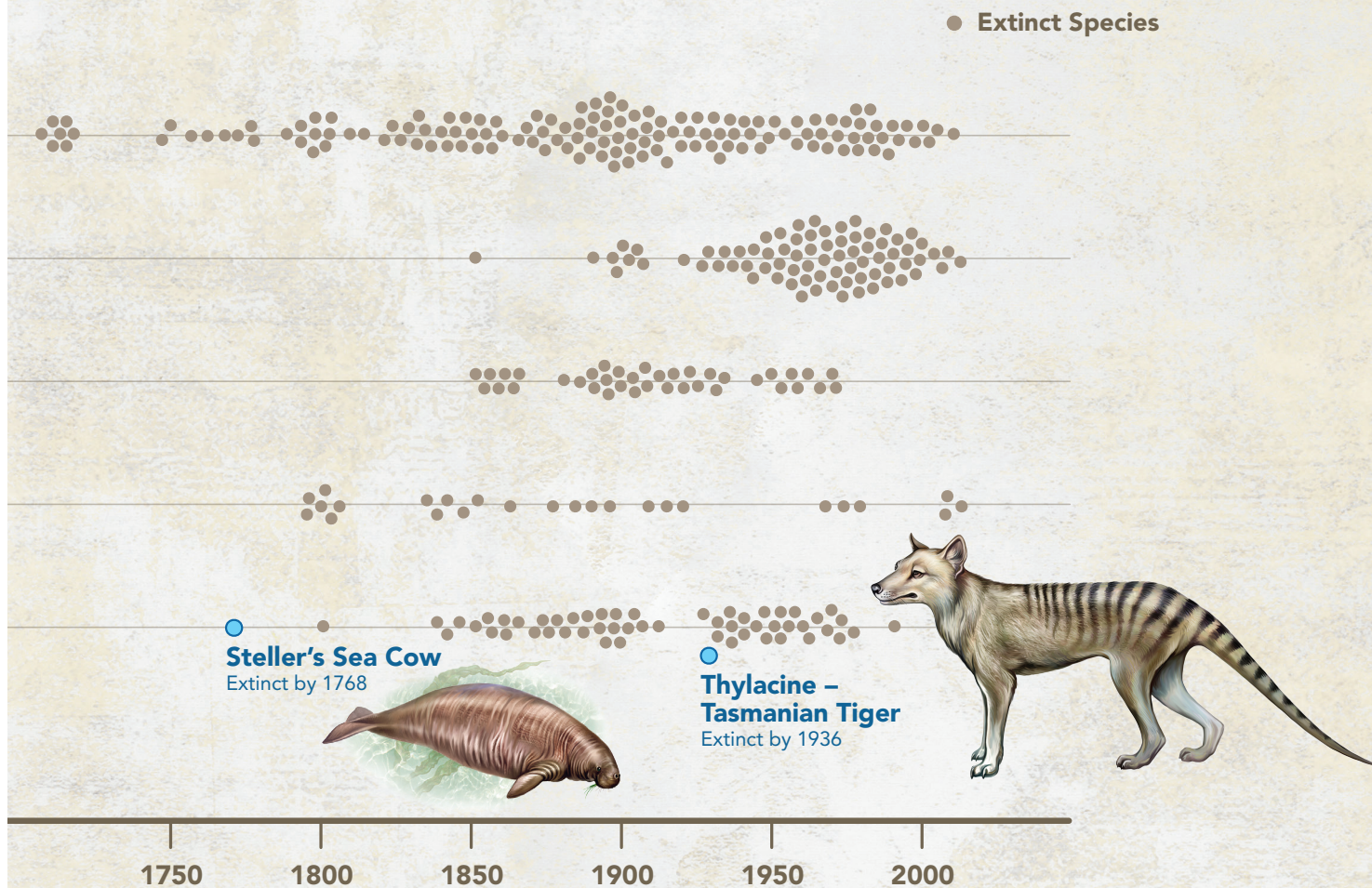


The data plot above shows animal species suspected to have gone extinct over the past 5 centuries. Each dot represents one species.

More than 1 million species are currently on the brink of extinction.

In a healthy environment, species naturally go extinct and are replaced by new ones. Evidence indicates that current extinction rates are significantly higher than those before human influence.

Active conservation efforts still play a vital role in protecting Earth's biodiversity. By learning about and engaging in conservation, we can help save species and keep ecosystems healthy for future generations.



What patterns do you notice in the data?

If you make a claim based on your observations, where in the data is the evidence to support it?

What do you wonder about as you look at the data?

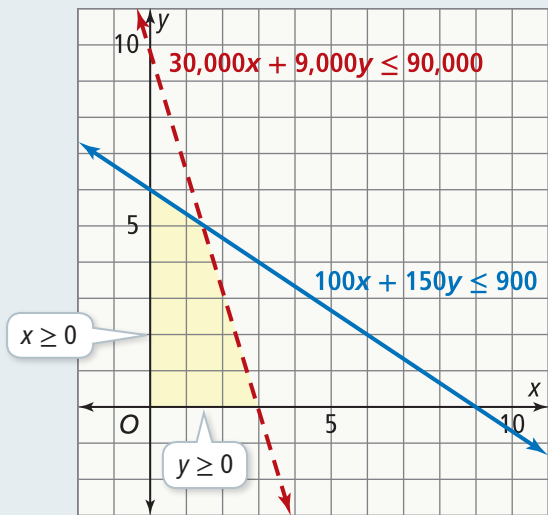
CALIFORNIA'S CONSERVATION BUDGET IS ONE OF THE LARGEST IN THE U.S.

An environmental organization has a \$90,000 budget and 900 worker-hours available for conservation projects. Using the equation $I = 80x + 60y$, where x represents tigers and y represents African savanna elephants, determine the combination of projects that maximizes the impact score while staying within the constraints.

An **impact score** quantifies the effectiveness or significance of an action or project, assessing how well it meets its goal.

Endangered Species		Region	Population Estimate	Cost	Worker-Hours	Impact Score
	Red Wolf	North America	20–30	\$5,000	90	50
	African Savanna Elephant	Africa	415,428	\$9,000	150	60
	Tiger	Asia	2,608–3,905	\$30,000	100	80
	Galapagos Giant Tortoise	South America	15,000	\$35,000	200	80
	Blue Whale	Oceans	5,000–15,000	\$20,000	150	50
	California Condor	North America	93	\$10,000	80	60

- Given the system of inequalities shown in the graph, explain what each inequality represents. What do the variables represent and what are the constraints?
- How could you determine the highest possible impact score?
- If you prioritize one project over the other, how is the impact score affected?
- How could you adjust your plan if additional resources or constraints are introduced? For example, suppose you receive extra funding or the number of available worker hours is reduced.



DRIVE YOUR INVESTIGATION

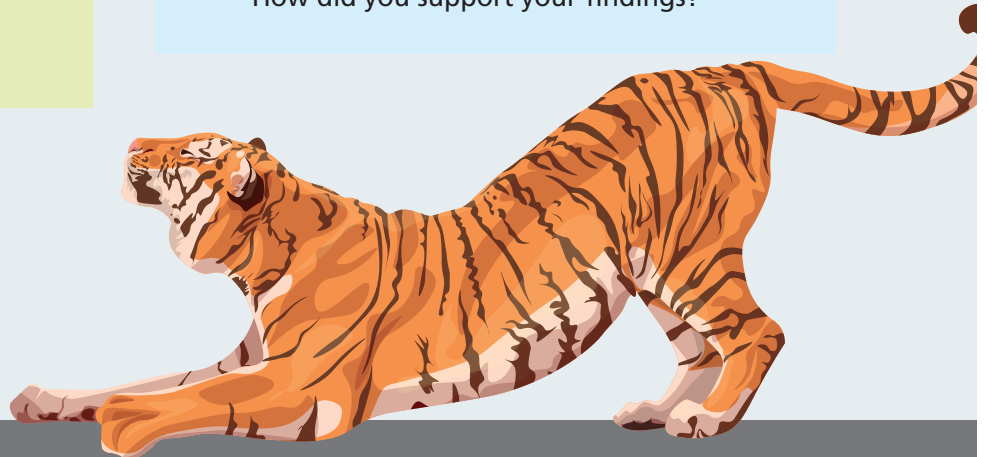
Choose an endangered species of interest to you for a new conservation project. To drive your investigation, you can use the conservation projects from the previous page. Alternatively, you could research other variables related to endangered species, using data from an official website.

1. **Make Sense of the World** What variables did you research related to your chosen endangered species? Develop a model that you could use to describe the relationship between the variables.
2. **Predict** Over the past 100 years, the rate of animal extinctions has dramatically exceeded the natural extinction rate. Based on your findings, predict how conservation efforts could influence the survival of the species.
3. **Make An Impact** How could changes in conservation efforts or environmental policies affect the future for endangered species?

REFLECT ON MATH PRACTICES AND PROCESSES

Choose two of the following questions to reflect on how you engaged with the math practices and processes during the investigation.

1. **Model with Mathematics** Which mathematical model did you use to answer the questions?
2. **Reason** How might the impact of your conservation project change if new data about the endangered species becomes available? How would you integrate this new information into your existing model?
3. **Make Sense and Persevere** When you encountered difficulties during the investigation, how did you work through them? What steps did you take to overcome obstacles and stay on track?
4. **Communicate Precisely** How did you determine the validity of your work? How did you support your findings?



EXTENSION

Investigate conservation efforts of endangered species or habitats in your community.

- What conservation efforts are currently underway in your community to protect endangered species or habitats?
- How effective have these conservation efforts been in preserving endangered species or habitats? Propose improvements to existing efforts, or explain why the efforts are sufficient.
- Support your recommendations with your mathematical findings.