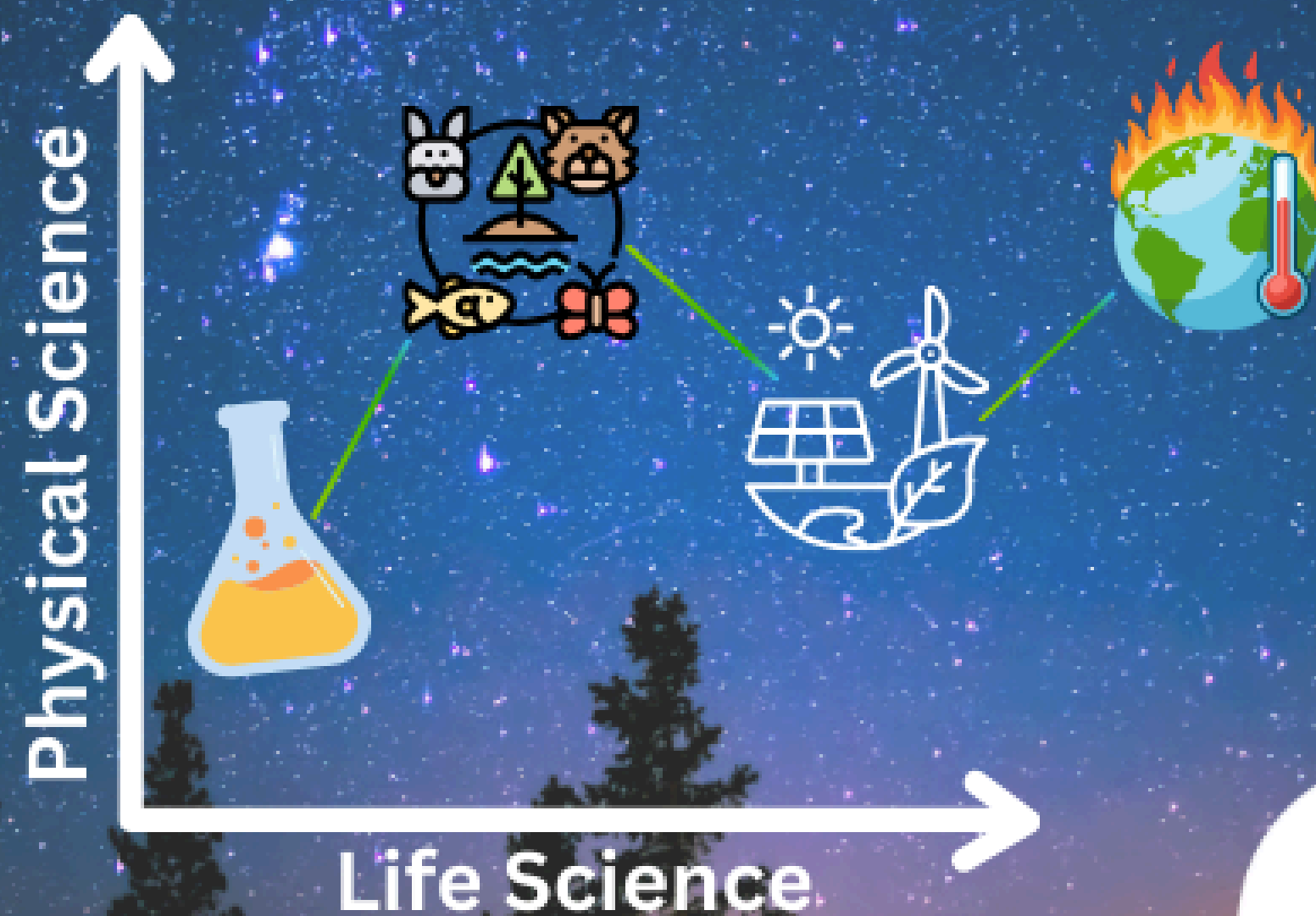


Middle School Science Graphing & Data Analysis Mega Bundle

Graphing Activities Across
ALL TOPICS

NO PREP - Just
download and Go!



6th, 7th, 8th Grade



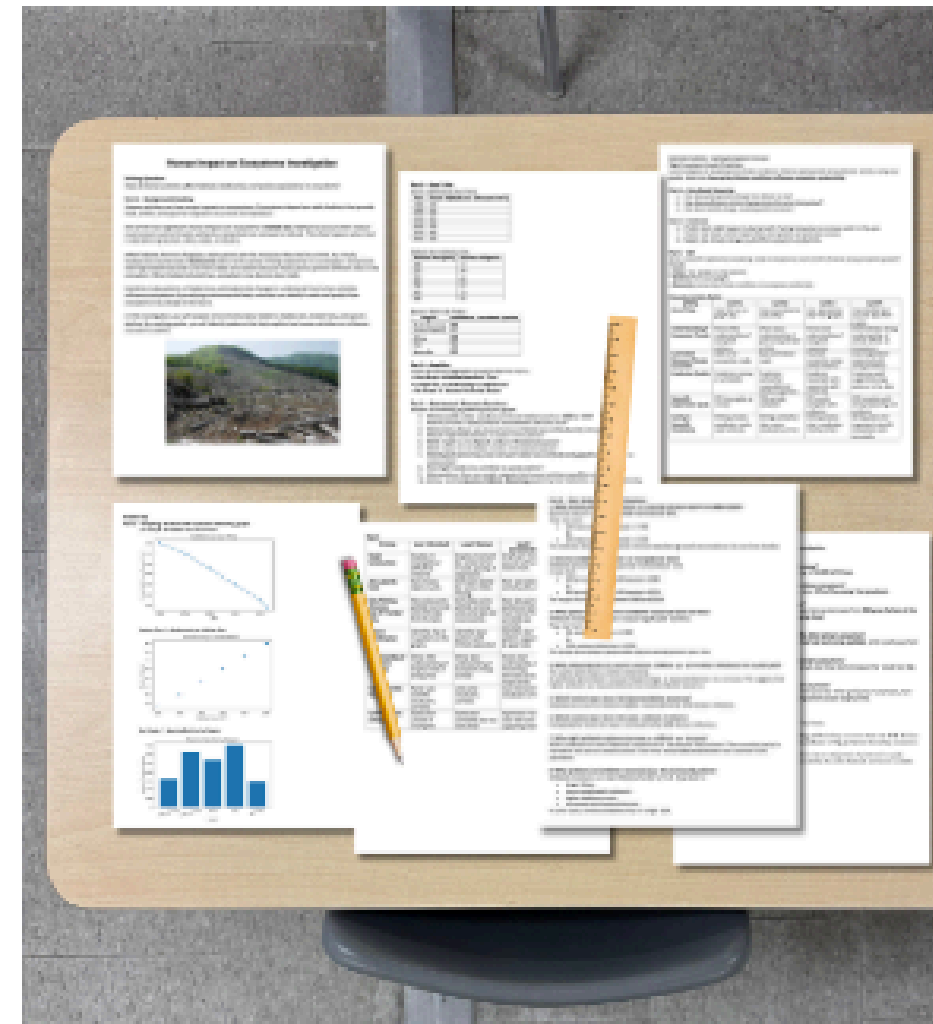
**Students use Real
World Data to
create different
graphs and answer
topic-specific
questions.**

**SCROLL
to take a look inside!**

HOW THESE ACTIVITIES HELP YOU

- **Saves Prep Time** - Everything is pre-made, ready to go, and **FULLY EDITABLE**.
- **Provides Built-In Assessments** - The rubric let you quickly check for understanding.
- **Encourages evidence-based reasoning** by having students use graphs to explain how and why trends and changes occur

EACH INVESTIGATION



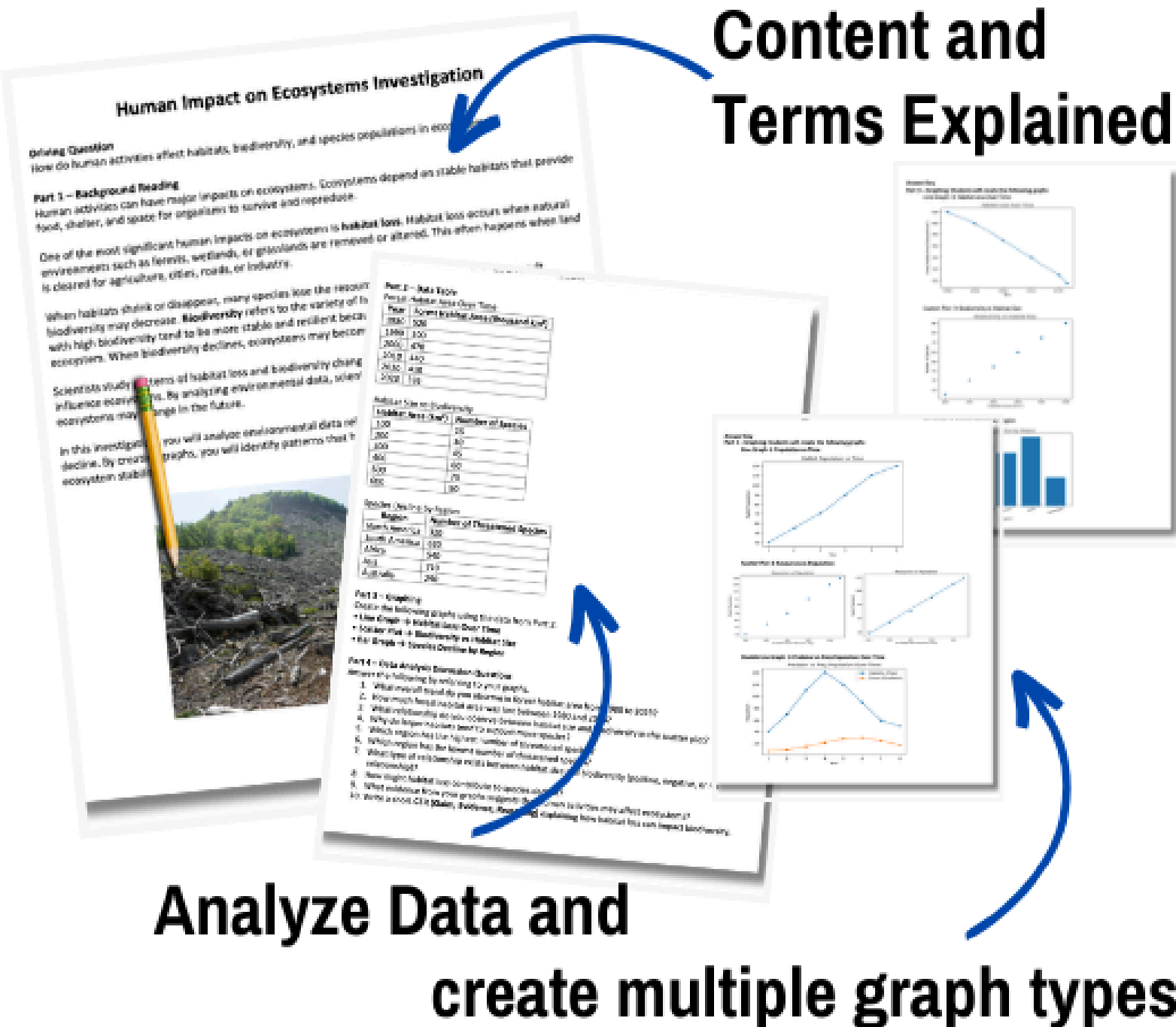
- Background Reading & Terms
- Data Tables
- Students Create Different Graph Types
- Extension Activity
- Full Marking Rubric

Students Use Their Graphs to Answer Questions and Draw a Conclusion

Some Topics Students Will Learn

NO PREP OR MATERIALS

**Content and
Terms Explained**



- ✓ **Patterns and trends in scientific data**
- ✓ **Relationships between variables in scientific systems**
- ✓ **Environmental changes and Earth systems processes**
- ✓ **Energy flow and resource use in natural systems**
- ✓ **Population dynamics and ecosystem interactions**
- ✓ **Human impacts on Earth and environmental sustainability**
- ✓ **Motion, forces, and energy transfer in physical systems**
- ✓ **Thermal energy, heat transfer, and phase changes**
- ✓ **Seasonal environmental patterns and climate trends**
- ✓ **Scientific data interpretation and evidence-based explanations**

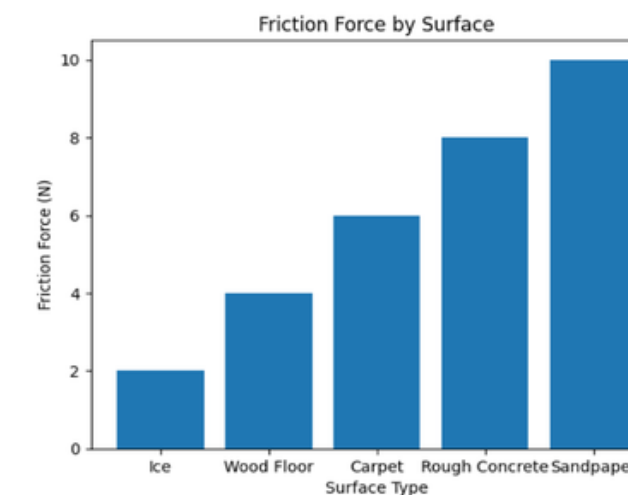
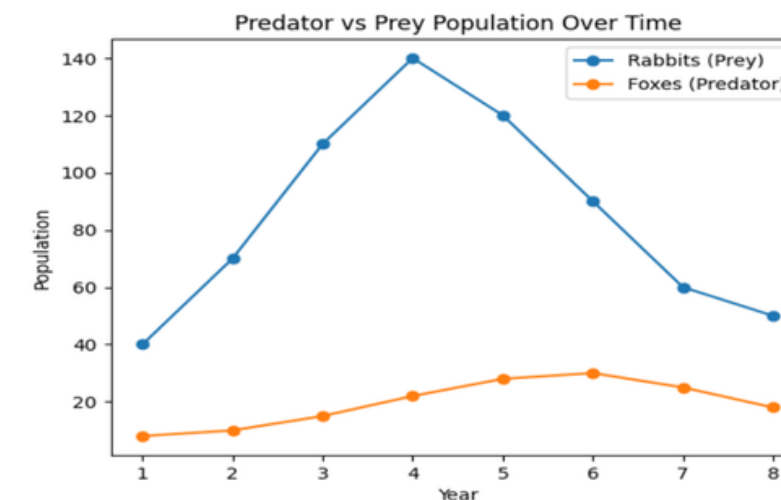
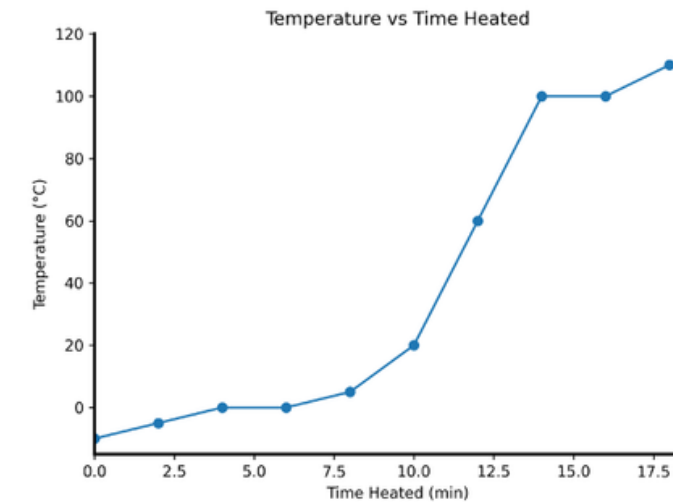
Classroom Fit Guarantee

I want you to feel confident when you purchase from Teach With Fergy. If a resource is not the right fit for your students, simply contact me and I'll provide double your purchase amount in store credit toward another resource in my store.



- Each Topic includes Three Investigations that use real-world data for students to graph and analyze
- Multiple graphing tasks (line graphs, double line graphs, bar graphs, and scatter plots) with data tables and analysis questions
- Complete teacher supports including answer keys, discussion questions, extension activities, and grading rubrics

What You Get



Energy Available by Trophic Level

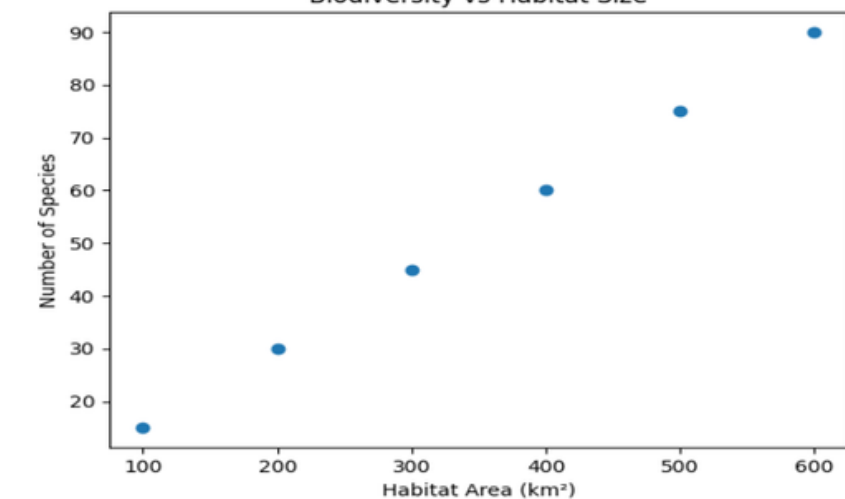
Trophic Level	Energy Available (kJ/m ² /year)
Producers	10000
Primary Consumers	1000
Secondary Consumers	100
Tertiary Consumers	10

Energy Transfer Through Trophic Levels

Trophic Level	Energy Remaining (kJ/m ² /year)
Producers	10000
Primary Consumers	1000
Secondary Consumers	100
Tertiary Consumers	10

Biomass by Trophic Level

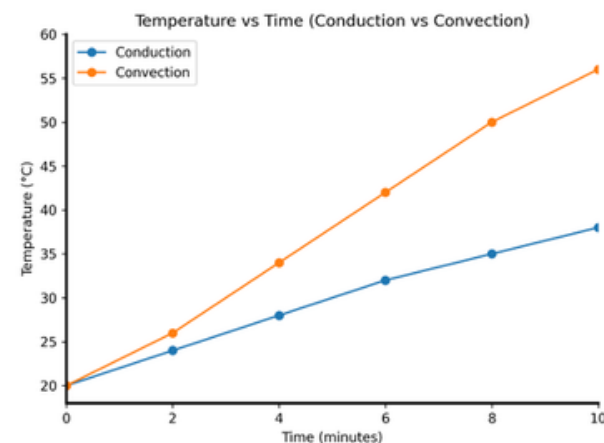
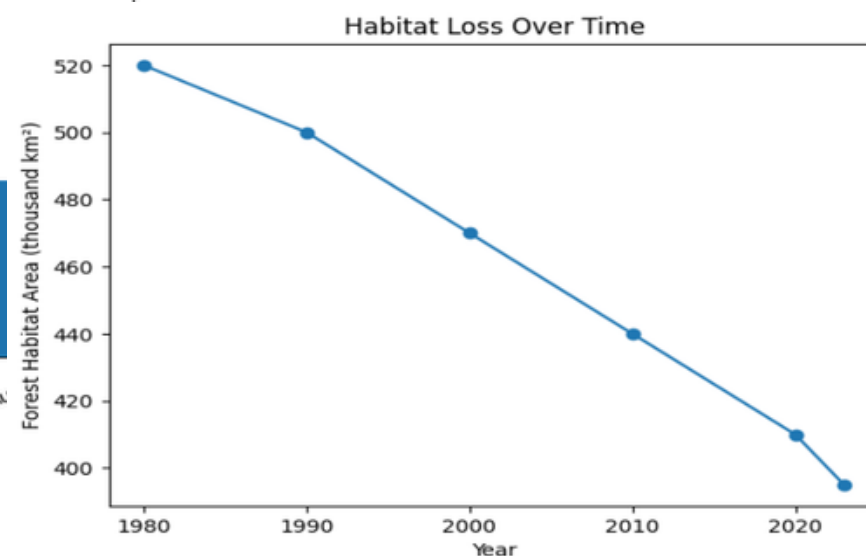
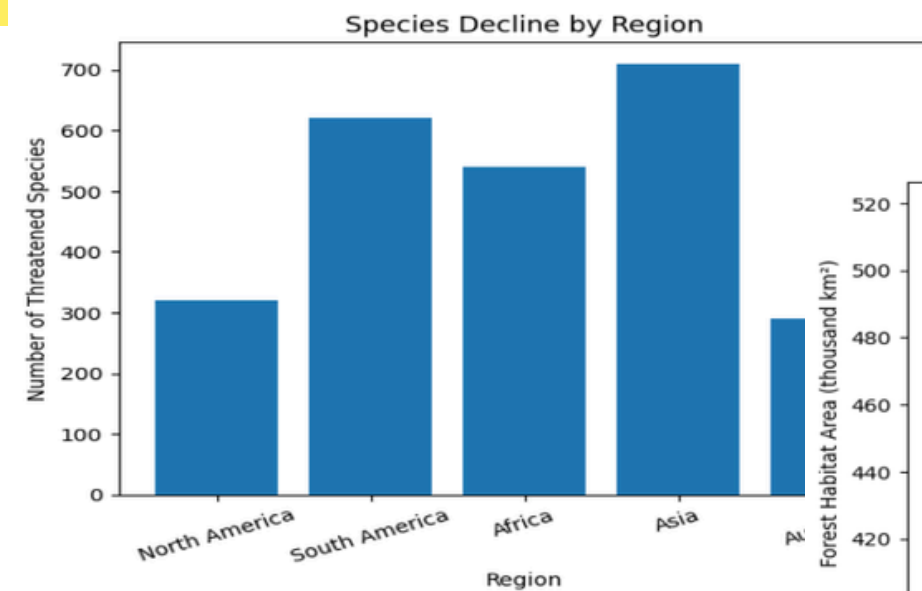
Trophic Level	Biomass (kg per hectare)
Producers	900
Primary Consumers	150
Secondary Consumers	25



Rubric

Criteria	Level 1 (Limited)	Level 2 (Some)	Level 3 (Considerable)	Level 4 (Thorough)
Graph Construction	Graphs incomplete or unclear	Graphs contain scale errors	Graphs mostly accurate	Graphs accurate and well-constructed
Axis Labels & Units	Missing labels	Some labels	Most labels correct	All labels and units correct
Data Plotting Accuracy	Data incorrect	Some correct	Most correct	All accurate
Use of Provided Data	Uses little data	Uses some data	Uses most data	Uses all data appropriately
Pattern Identification	Few patterns identified	Basic patterns	Clear patterns	Detailed accurate patterns
Resource Trend Understanding	Limited understanding	Basic understanding	Clear understanding of trends	Strong understanding using data evidence
Connection to Depletion	Weak connection	Basic connection	Accurate connection	Clear explanation of how trends relate to depletion
Scientific Vocabulary	Rare use	Some correct use	Mostly correct use	Accurate throughout
Communication of Reasoning	Unclear	Somewhat clear	Mostly clear	Logical and well supported

What Will Your Students Learn?



Energy Available by Trophic Level

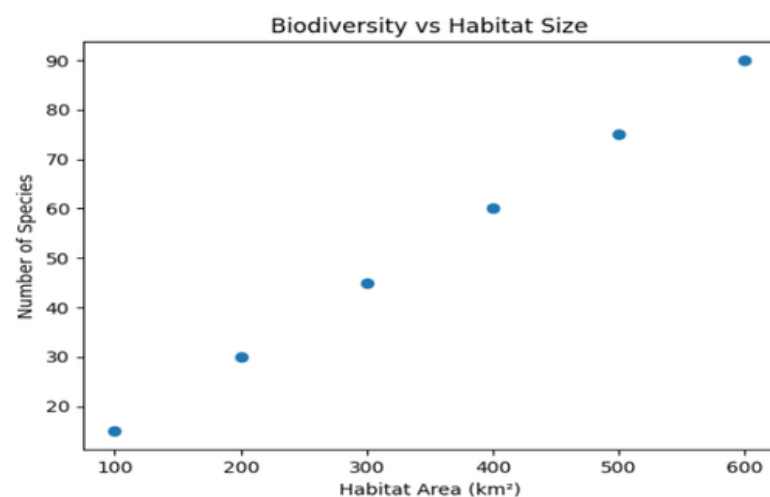
Trophic Level	Energy Available (kJ/m ² /year)
Producers	10000
Primary Consumers	1000
Secondary Consumers	100
Tertiary Consumers	10

Energy Transfer Through Trophic Levels

Trophic Level	Energy Remaining (kJ/m ² /year)
Producers	10000
Primary Consumers	1000
Secondary Consumers	100
Tertiary Consumers	10

Biomass by Trophic Level

Trophic Level	Biomass (kg per hectare)
Producers	900
Primary Consumers	150
Secondary Consumers	25
Tertiary Consumers	5



- ✓ Helps students build **graphing and data analysis** skills using real-world data.
- ✓ Supports **NGSS Science & Engineering Practices** through analyzing patterns and relationships (i.e. predator–prey populations, heating curves, snowmelt, infection rates, etc.
- ✓ Connects **science concepts** (such as **food webs, viral transmission, population dynamics, seasonal temperature change, force and motion, etc.**) to real-world data and scientific investigations.
- ✓ Encourages **evidence-based reasoning** by having students use graphs to answer topic-specific questions.

INCLUDED BONUSES

The following activities are included in your purchase.

The Case of the
Shrinking Balloon



Teach With Fergy

PHYSICAL & CHEMICAL CHANGE REAL-WORLD WHODUNNIT INVESTIGATION

The Case of the
FOGGY CLASSROOM WINDOW



Teach With Fergy

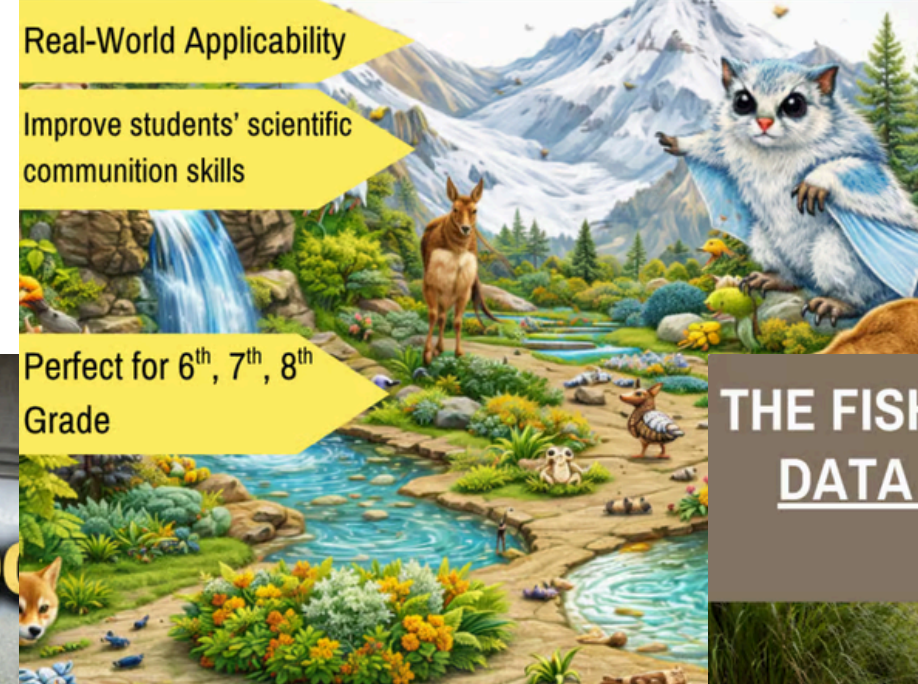
PHYSICAL & CHEMICAL CHANGE REAL-WORLD WHODUNNIT INVESTIGATION

DESIGN A HABITAT & ECOSYSTEM PROJECT

Real-World Applicability

Improve students' scientific communication skills

Perfect for 6th, 7th, 8th Grade



Teach With Fergy

THE FISH KILL AT RIVERBEND C
DATA ANALYSIS AND GRAPH
INVESTIGATION



Teach With Fergy

GRAPHING AND ANALYZING ECOSYSTEM IMPACTS USING REAL DATA

THE DYING WETLAND PLANTS
DATA ANALYSIS AND GRAPHING
INVESTIGATION



Teach With Fergy

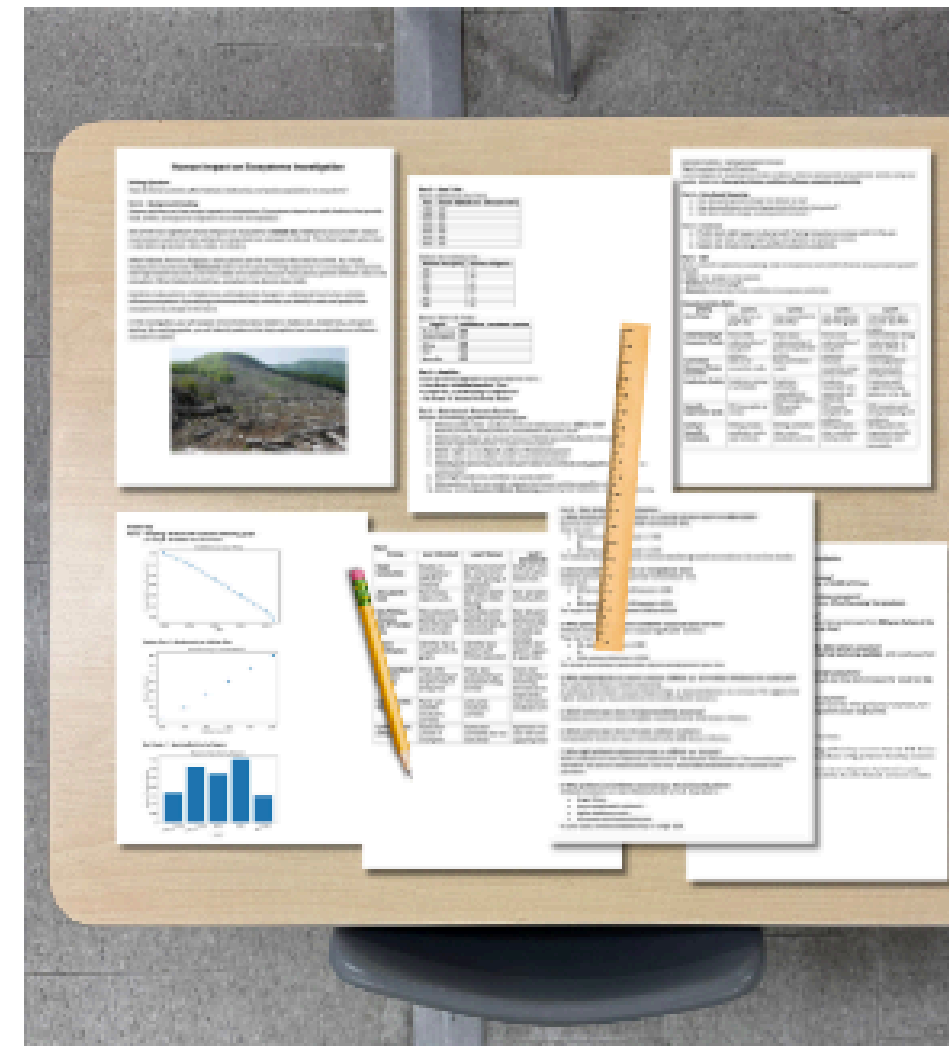
GRAPHING AND ANALYZING ECOSYSTEM IMPACTS USING REAL DATA

Your Activities

- Include a background reading for student understanding
- **DIGITAL and PRINT** ready
- **FULLY EDITABLE**
- **Extension activities** for early finishers
- **Complete Answer Key**



EACH INVESTIGATION



- Background Reading & Terms
- Data Tables
- Students Create Different Graph Types
- Extension Activity
- Full Marking Rubric

Students Use Their Graphs to Answer Questions and Draw a Conclusion

NO PREP - JUST PRINT AND GO

1. Students read the background information and terms

2. Analyze datasets

3. Create graphs from the data

4. Answer questions based on information from graphs

5. Optional: Complete Extension Activity

Students Use Their Graphs to Answer Questions and Draw a Conclusion

Global Pandemic Spread & Population Risk Investigation

Driving Question
How do population size and global travel influence the spread and impact of pandemics?

Part 1 – Background Reading
A pandemic occurs when an infectious disease spreads across multiple countries or continents and affects a large number of people. Pandemics are different from local outbreaks or epidemics because they affect populations around the world.

Pandemics are often caused by viruses that spread easily between people. Historical examples include the 1918 influenza pandemic, the SARS outbreak in 2003, the Ebola outbreaks, and the COVID-19 pandemic. Several factors can influence how quickly a disease spreads during a pandemic. One important factor is **population size and density**. When more people live in close proximity, viruses can spread more easily from person to person.

Another factor is **global travel and transportation**. In the modern world, people travel between countries frequently by airplane, ship, and other forms of transportation. This can allow diseases to spread rapidly between regions.

Scientists track the number of cases, deaths, and population characteristics during pandemics to understand how diseases spread and how communities can better respond to future outbreaks.

In this investigation, you will analyze real-world style pandemic data to explore how population size, disease cases, and mortality rates relate to each other. By graphing the data, you will identify patterns that help explain how pandemics spread and why some populations may face higher risks.

Part 2 – Data Table
A. Global Pandemic Cases Over Time

Year	Global Pandemic Cases (millions)
1918	500
1957	200
1968	150
2009	120
2020	650
2023	770

B. Global Population vs Pandemic Cases

Year	Global Population (billions)	Pandemic Cases (millions)
1918	1.8	500
1957	2.8	
1968	3.5	
2009	6.8	
2020	7.8	
2023	8.0	

Extension Activity – Designing a Racetrack
Task: Motion Engineering Challenge
Engineers often study motion data when designing racetracks, transportation systems, and safety features. Understanding speed and distance relationships helps engineers create efficient designs. In this activity, you will use motion data to analyze how speed affects travel time.

Part A – Data-Based Analysis
Use your graphs to answer the following questions.
1. How does distance change as time increases for the bicycle?
2. What does the constant speed of the bicycle suggest about its motion?
3. How does the bicycle's speed compare to the speeds of the other objects in the data table?

Part B – Engineering Application
Imagine you are designing a short racetrack for a bicycle race.
1. If a cyclist travels at 5 m/s, how far would they travel in 12 seconds?
2. Why might engineers study motion graphs when designing roads or racetracks?
3. Suggest one factor that might cause a cyclist's speed to change during a race.

Part C – Claim, Evidence, Reasoning (CER)
Write a short scientific explanation answering the question:
How do distance-time graphs help scientists and engineers understand motion?
Your response must include:
Claim: Your answer to the question
Evidence: Data from your graphs
Reasoning: A scientific explanation describing how speed, distance, and time are related.

Extension Activity Rubric: Designing a Racetrack

Criteria	Level 1	Level 2	Level 3	Level 4
Use of Data	Uses little or no data from graphs	Uses some data but lacks detail	Uses appropriate data from graphs	Uses detailed and accurate data from graphs
Understanding of Motion Concepts	Shows little understanding of speed, distance, and time relationships	Shows basic understanding of motion relationships	Shows clear understanding of how speed, distance, and time are related	Demonstrates strong understanding of motion concepts supported by data
Application to Engineering Scenario	Recommendation missing or unrealistic	Recommendation somewhat logical but weakly supported with some data	Recommendation logical and supported based on motion data	Recommendation well-supported and clearly based on motion data
Scientific Explanation	Explanation unclear or incorrect	Basic explanation provided	Mostly accurate explanation connecting motion variables	Clear and scientifically accurate explanation connecting speed, distance, and time
CER Structure	Incomplete or missing parts	Partly complete CER with limited evidence	Mostly complete CER with strong claim, detailed evidence, and clear reasoning	Complete CER with strong claim, detailed evidence, and clear reasoning

Part 2 – Data Table
Population Growth Over Time

Year	Rabbit Population
1	40
2	55
3	70
4	90
5	110
6	120

Resources vs Population Size

Available Plant Biomass (kg)	Rabbit Population
200	40
300	55
400	70
500	90
600	110
650	120

Predator vs Prey Population

Year	Rabbits (Prey)	Foxes (Predator)
1	40	8
2	70	10
3	110	15
4	140	22
5	120	28
6	90	30
7	60	25
8	50	18

Part 3 – Graphing
Create the following graphs using the data from Part 2:
• Line Graph → Population vs Time
• Scatter Plot → Resources vs Population
• Double Line Graph → Predator vs Prey Population Over Time

Part 4 – Data Analysis Discussion Questions
Answer the following by referring to your graphs.
1. What overall pattern do you observe in the population vs time graph?
2. How does the rabbit population change over the six-year period?
3. What relationship do you observe between available resources and population size?
4. Why does population growth often slow as resources become limited?
5. Which species has the faster population in the predator-prey graph?

C. Population Density vs Pandemic Mortality Rate

Population Density (people/km ²)	Mortality Rate (%)
50	1.2
100	1.6
200	2.1
400	2.8
800	3.4

Part 3 – Graphing
Create the following graphs using the data from Part 2:
• Line graph → Global pandemic cases over time
• Scatter plot → Global population vs pandemic cases
• Bar graph → Mortality rate by population density

Part 4 – Data Analysis Discussion Questions
Answer the following by referring to your graphs.
1. What overall pattern do you observe in global pandemic cases over time?
2. How has global population changed from 1918 to 2023?
3. What relationship do you observe between global population and pandemic cases in the scatter plot?
4. How does population density appear to affect mortality rates?
5. Why might densely populated areas experience higher mortality during pandemics?
6. How might global travel influence the spread of pandemics?
7. Why is it important for scientists to track pandemic data over long periods of time?
8. What strategies might help reduce the spread of pandemics in large populations?
9. How could public health responses help reduce mortality during pandemics?
10. Write a short CER explaining how population size and density can influence pandemic spread.

Rubric

Criteria	Level 1	Level 2	Level 3	Level 4
Graph Construction	Graphs incomplete or unclear	Graphs contain scale errors	Graphs mostly accurate	Graphs accurate and well-constructed
Axis Labels & Units	Missing labels	Some labels	Most labels correct	All labels and units correct
Data Plotting Accuracy	Data incorrect	Some correct	Most correct	All accurate
Use of Data	Uses little data	Uses some data	Uses most data	Uses all data appropriately
Pattern Identification	Few patterns identified	Basic patterns	Clear patterns	Detailed accurate patterns
Understanding of Pandemic Trends	Limited understanding	Basic understanding	Clear understanding of pandemic patterns	Strong understanding supported by data
Connection to Population Factors	Weak connection	Basic connection	Accurate connection	Clear explanation of how population influences spread
Scientific Vocabulary	Rare use	Some correct use	Mostly correct use	Accurate throughout
Communication of Reasoning	Unclear	Somewhat clear	Mostly clear	Logical and well supported

Extension Activity – Pandemic Preparedness Plan
Task: Reducing Pandemic Risk

Answer Key
Part 3 – Graphing: Students will create the following graphs

Temperature vs Plant Growth

Population Growth vs Time

Rabbit Activity vs Month

Population vs Plant Growth

Answer Key
Part 3 – Graphing: Students will create the following graphs

Line graph → Daylight Hours vs Month

Double Line Graph → Temperature vs Daylight Hours (include a legend)

Bar graph → Mortality vs Plant Growth

negative, or no population growth.

MULTIPLE GRAPH TYPES: BAR, LINE, DOUBLE LINE, & SCATTER PLOT

Part 2 – Data Table
Population Growth Over Time

Year	Rabbit Population
1	40
2	55
3	70
4	90
5	110
6	120

Resources vs Population Size

Available Plant Biomass (kg)	Rabbit Population
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Predator vs Prey Population

Year	Rabbits (Prey)	Foxes (Predator)
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8	50	18

Part 3 – Graphing
Create the following graphs using the data from Part 2.

- Line Graph → Population vs Time
- Scatter Plot → Resources vs Population
- Double Line Graph → Predator vs Prey Population Over Time

Part 4 – Data Analysis Discussion Questions
Answer the following by referring to your graphs.

- What overall pattern do you observe in the population vs time graph?
- How does the rabbit population change over the six-year period?
- What relationship do you observe between available resources and population size?
- Why does population growth often slow as resources become limited?
- Which species has the larger population in the predator-prey graph?
- How might an increase in rabbit population affect the fox population?
- What type of relationship exists between resources and population size (positive, negative, or no relationship)?
- Why do ecosystems have limits to population growth?
- How might predator populations help maintain ecosystem balance?
- Write a short

Answer Key
Part 3 – Graphing: Students will create the following graphs

Line Graph → Population vs Time

Scatter Plot → Resources vs Population

Double Line Graph → Predator vs Prey Population Over Time

Answer Key
Part 3 – Graphing: Students will create the following graphs

Line Graph → Daylight Hours vs Month

Double Line Graph → Temperature vs Daylight Hours (include a legend)

Answer Key
Part 3 – Graphing: Students will create the following graphs

Line Graph → Force vs Acceleration

Scatter Plot → Mass vs Acceleration

Bar Graph → Force Comparisons

Extension Activity – Designing a Racetrack
Task: Motion Engineering Challenge
Engineers often study motion data when designing racetracks, transportation systems, and safety features. Understanding speed and distance relationships helps engineers create efficient designs. In this activity, you will use motion data to analyze how speed affects travel time.

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Use your graphs to answer the following questions.

- How does distance change as time increases for the bicycle?
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Part B – Engineering Application
Imagine you are designing a short racetrack for a bicycle race.

- If a cyclist travels at **5 m/s**, how far would they travel in **12 seconds**?
- Why might engineers study motion graphs when designing roads or racetracks?
- Suggest one factor that might cause a cyclist's speed to change during a race.

Part C – Claim, Evidence, Reasoning (CER)
Write a short scientific explanation answering the question:
How do motion graphs help scientists and engineers understand motion?

Your explanation should include:
• A claim that answers the question
• Evidence from your graphs
• Reasoning that connects the evidence to the question and explains the scientific explanation describing how speed, distance, and time are related.

Extension Activity Rubric: Designing a Racetrack

	Level 1	Level 2	Level 3	Level 4
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CER Structure	Incomplete or missing parts	Partly complete CER with limited evidence	Mostly complete CER with appropriate evidence	Complete CER with strong claim, detailed evidence, and clear reasoning

Students Create Different Types of
Graphs Based on Real World Data

Each Investigation Includes an
Extension Activity & Rubric

Thanks
**for your interest
in this resource!**

I am a real person and if
you have any questions,
suggestions, or concerns,
please reach out.



devon@teachwithfergy.com

TWF

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*Let's
Connect!*

