Biology E-Learning Plans

Day 1: Gimkit Review

Students will play a round of Biology EOC Gimkit Review – the Gimkit includes EOC practice questions frome very unit covered so far (questions for new units will be added as the semester progresses). The game has been set up to take the expected 50 minutes to be completed.

Gimkit Link: https://www.gimkit.com/join/68acbb9274d619eb53199f86

Day 2: Virtual Research Poster – Cell "Wanted" Poster

Students will make a virtual Poster in Canva where they pick an organelle of the cell, personify it and explain their 'crimes', i.e. what would happen if the organelle went missing from the cell.

Day 3: Cell Factory Activity Packet

Students will read the article reviewing the organelles of a eukaryotic cell and their functions. Then, students will go through a series of activities to practice their mastery of the content and build conceptual understandings of the organelles' relationships to each other.

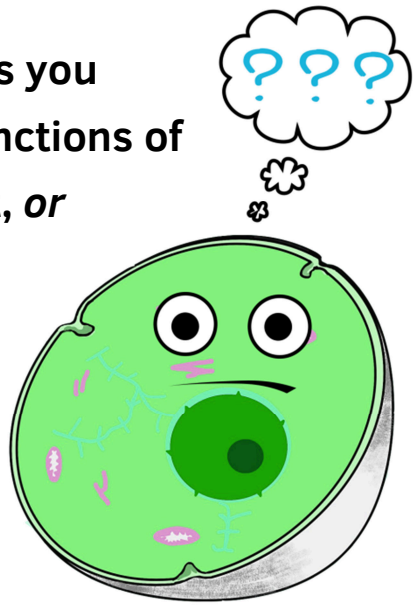
Day 4: PBS Learning Articles and Questions

Students will pick one from a selection of 3 chosen articles from PBS Learning Media to read and answer connecting questions about. They will complete a short worksheet going through what they learned from the article.

Day 5: Biology Graph reading and writing assignment

Students will practice reading graphs, answering questions about the graphs, and then make their own graph based on a set of data given to them. They will then draw conclusions based on the data and graph they made.

Cell Organelle Wanted Poster



Uh-Oh! Your cells have lost one of their organelles. As you know, organelles are necessary to provide the life functions of a cell. Your cells need to get their organelle back fast, *or else!*

You have decided to help out by creating a Wanted Poster to bring the organelle back to its rightful place. Your cells have asked that you include the following on your wanted poster:

- Name of the missing organelle
- A picture of the missing organelle
- The reward offered
- The "jobs" of the missing organelle
- What has happened to the cell since it went missing
- How it went missing
- What will happen to the cell if it does not return
- Other organelles that may be affected by it not returning

Your poster needs to be eye-catching so people know how to spot the culprit, so use plenty of color and detail. Make sure you are descriptive so people know exactly who to look for. Your Police Chief will be evaluating you based on your attention to this project, so a set of evaluation guidelines will be included.

The deadline for your poster is _____...*before it is too late*!

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NAME: _____ **CLASS:** _____

Task	Number of Points	Points Awarded
Name of the Missing Organelle	5	
Picture of the Missing Organelle	15	
Reward Offered	5	
The Missing Organelle's Jobs	15	
The Effect Upon the Cell Since it has been Missing	15	
How the Organelle Went Missing	5	
What Will Happen to the Cell if it does not Return	15	
Other Organelles that may be Affected by it Not Returning	10	
Colorful, Creative and Eye-Catching	10	
Neat and Legible	5	
Total Points	100	

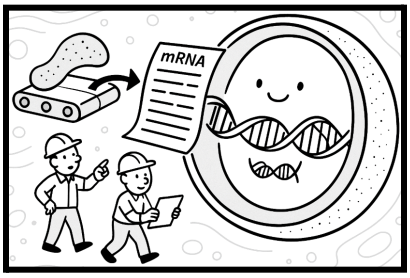
Teacher Feedback:

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THE CELL

Welcome to the Factory!

Okay, picture this: You're on a tour of the weirdest, busiest, most chaotic factory on the planet. There are conveyor belts clanking, forklifts zipping by, and people in safety goggles shouting about inventory and shipping schedules. But here's the twist, this isn't a factory for cars or cookies or smartphones. It's a living **cell**. And every single part of it is hustling like it's working overtime on a Friday.



Let's say you're a tiny tourist (you know, microscopic) visiting this factory for a day. First stop: the **nucleus**. This place is like the CEO's private office, sealed tight and loaded with confidential files. Except instead of emails and spreadsheets, the **nucleus** stores **DNA**, the ultimate instruction manual for how everything in the **cell** works. The **nuclear envelope** is like a high-tech security system, letting in only the right molecules and keeping the riff-raff out. If you're not on the list? Tough luck.

Now, don't expect the **nucleus** to be out there on the factory floor swinging a hammer. That's not how this CEO rolls. The **nucleus**'s job is to hand out orders, written in **genetic code**, so the rest of the **cell** can get to work. Think of it like this: the **nucleus** sends out **mRNA** (**messenger RNA**), kind of like a work order or blueprint, telling the workers what to build. And that's where we head next.

Down on the production floor, we've got the **ribosomes**. These guys are the gritty, no-nonsense assembly lines of the **cell**. Their job? Building **proteins**, which are like the products of this biological factory. Everything from **enzymes** to **hormones** to structural materials… yep, they're all made right here, bead by bead, **amino acid** by **amino acid**. **Ribosomes** can be free-floating in the **cytoplasm** or stuck to the **rough endoplasmic reticulum** (the **RER**, if you're into abbreviations). That just means they've got a fancier workstation. More conveyor belts, more productivity!

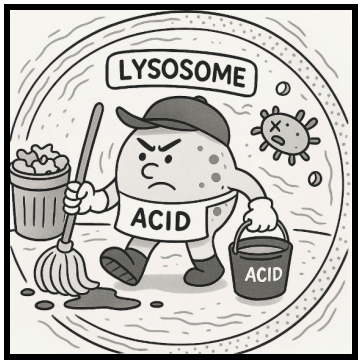


Oh, and speaking of conveyor belts, the **endoplasmic reticulum** is like the factory's transportation network. The **rough ER** is covered in **ribosomes** (hence the "rough"), while the **smooth ER** is more like the quality control and chemical packaging department. It makes **lipids** and detoxifies nasty stuff. You know, the kind of job nobody wants to do, but everyone's glad somebody does.

But even the hardest-working machines can't run without power. That's where the **mitochondria** come in. Think of them as the power plant of the **cell**, cranking out **ATP**, the energy currency **cells** use to do basically everything. The **mitochondria** are the MVPs of **cell**

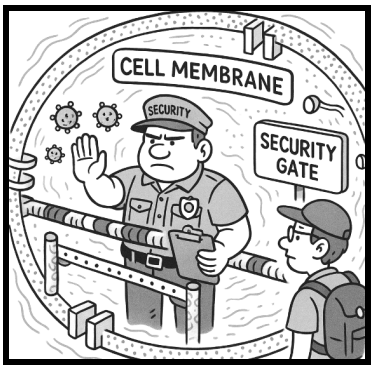
metabolism, taking in **glucose** and **oxygen** and pumping out enough energy to keep all the other departments humming. Without them? Game over.

Next, you'll want to swing by the **Golgi apparatus**. Weird name, cool job. This department is basically the packaging and shipping center. **Proteins** and **lipids** arrive here, get tagged and folded and packaged into **vesicles**, and are shipped off to wherever they're needed, either inside the **cell** or out into the world. The **Golgi** is like the Amazon warehouse of the **cell**. It even has return labels.



Meanwhile, **lysosomes** are like the janitors crossed with demolition experts. They break down trash, old parts, and invaders using **enzymes**. You don't want to mess with these guys. They've got acid and they're not afraid to use it. They clean up messes before things get out of control, which is good, because a dirty **cell** is a dead **cell**.

Now, every good factory needs solid infrastructure. That's the **cytoskeleton**, a network of **protein fibers** that gives the **cell** its shape and helps things move around. It's kind of like scaffolding mixed with a subway system. You've got **microtubules** acting like tracks, guiding **vesicles** like little trains, and **microfilaments** helping with **cell movement** and **division**.



And finally, possibly the most important feature of all, the **cell membrane**. This is the security gate, the border patrol, and the doorman all rolled into one. It controls **cellular transport**, meaning it decides what gets in and what gets out. It uses **protein channels**, **pumps**, and **receptors** to move materials like **ions**, **nutrients**, and **waste**. Sometimes it goes full spy mode and lets stuff in through **endocytosis** or kicks stuff out with **exocytosis**. Either way, it's a big deal.

Oh, and don't forget the **cytoplasm**, that jelly-like goop everything floats around in. Not glamorous, but it keeps everything suspended and helps with **diffusion**. Without it, the **organelles** would just be a pile of parts at the bottom of the **cell**.

So yeah, the **cell** isn't just a blob under a microscope, it's a 24/7 factory where everything has a job, everyone works as a team, and if one part fails, the whole place could crash. Understanding how all these **organelles** function together is key for everything in **biology**, from **biochemistry** to **gene expression** to how your body fights off a cold.

And next time you hear someone say **cells** are "simple," just smile and think: sure, simple, like running a factory with no sleep, no breaks, and a workforce made entirely of microscopic geniuses.

THE CELL

Welcome to the Factory!

Name _____ Date _____

Directions: Use complete sentences to answer the questions.

1. What is the role of the nucleus in the cell, and why is it compared to a CEO?

2. How do ribosomes and the rough ER work together to produce proteins?

3. Why is the mitochondrion called the "power plant" of the cell?

4. What is the function of the Golgi apparatus, and what does it do with proteins and lipids?

5. The author compares the cell to a factory. Choose two organelles and explain how their roles support this comparison.

Directions: Write T if the statement is true. Write F if the statement is false.

1. _____ The smooth ER is responsible for making proteins.
2. _____ Lysosomes contain enzymes that help break down waste.
3. _____ The cytoskeleton helps give the cell its shape and allows movement.
4. _____ The Golgi apparatus produces DNA and RNA.
5. _____ The cell membrane helps regulate what enters and leaves the cell.

THE CELL

Welcome to the Factory!

Name _____ Date _____

Directions: Choose the best answer.

1. **What structure contains the cell's genetic information?**
   a. Mitochondria
   b. Nucleus
   c. Ribosome

2. **Which organelle produces ATP?**
   a. Golgi apparatus
   b. Ribosome
   c. Mitochondrion

3. **What is the function of the ribosome?**
   a. Transport materials
   b. Make proteins
   c. Store genetic material

4. **What does the Golgi apparatus do?**
   a. Controls what enters and exits the cell
   b. Builds proteins
   c. Packages and ships proteins and lipids

5. **Which organelle detoxifies chemicals and makes lipids?**
   a. Smooth ER
   b. Rough ER
   c. Cytoplasm

6. **What surrounds and protects the nucleus?**
   a. Cytoskeleton
   b. Nuclear envelope
   c. Ribosome

7. **Where would you find free-floating ribosomes?**
   a. In the Golgi apparatus
   b. In the cytoplasm
   c. In the mitochondria

8. **Which organelle contains digestive enzymes?**
   a. Lysosome
   b. Cytoskeleton
   c. Nucleus

9. **Which structure controls cellular transport?**
   a. Smooth ER
   b. Cell membrane
   c. Nucleus

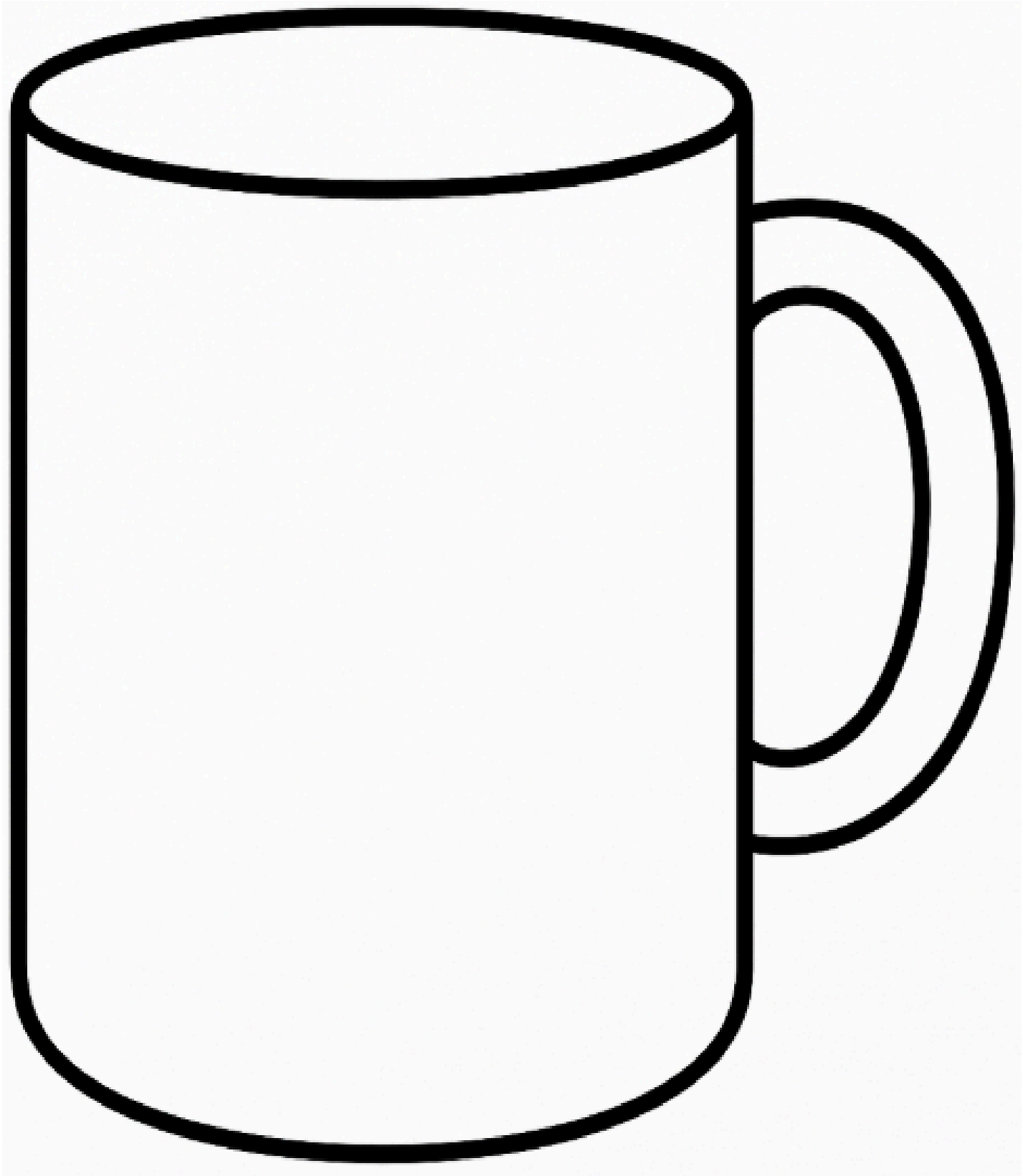
10. **What are vesicles used for?**
    a. Digestion
    b. Energy production
    c. Transport and packaging

11. **Which part of the cell helps it maintain shape and aids movement?**
    a. Golgi apparatus
    b. Cytoskeleton
    c. Ribosome

12. **What fills the cell and supports the organelles?**
    a. Cytoplasm
    b. Lysosome
    c. Endoplasmic reticulum

THE CELL

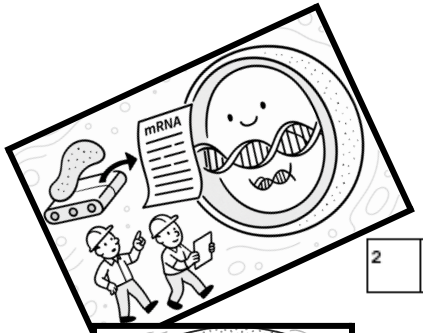
Design a creative logo that represents The cell factory. Your design should include a company name (be creative) logo have an image that represents the cell along with a catchy slogan. Be sure to color your design.

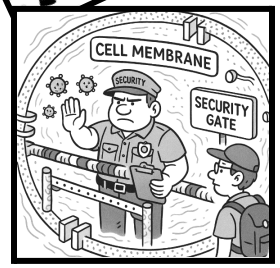


THE CELL

Welcome to the Factory!

Name _____ Date _____





Across

2. The jelly-like fluid that fills the cell and supports organelles.
3. Organelle that builds proteins, like an assembly line in a factory.
5. A type of cytoskeletal fiber that helps move materials within the cell.
8. Organelle known as the power plant of the cell that produces ATP.
10. The cell's security gate, controlling what enters and exits.
11. The main energy molecule produced by mitochondria.
12. Packages, tags, and ships proteins and lipids like a cellular post office.
13. Produces lipids and detoxifies harmful substances.
14. A small sac used to transport proteins and lipids around or out of the cell.

Down

1. Gives the cell its shape and acts like scaffolding and tracks.
4. The control center of the cell, like a CEO's office, where DNA is stored.
5. Messenger molecule that carries instructions from DNA to the ribosomes.
6. Breaks down waste and old parts; acts like the cell's clean-up crew.
7. Genetic material found in the nucleus that holds instructions for life.
9. Covered in ribosomes; transports proteins around the cell.

LEARNING TARGET

I can describe the structure and function of major cell organelles by comparing them to parts of a factory, and explain how these organelles work together to keep the cell functioning.

SUCCESS CRITERIA

- **I can identify and explain the role of key organelles such as the nucleus, mitochondria, ribosomes, endoplasmic reticulum, Golgi apparatus, lysosomes, cytoskeleton, and cell membrane.**
- **I can use analogies to describe how each organelle contributes to the cell's overall function.**
- **I can answer questions and complete activities that demonstrate my understanding of cell structure and function.**
- **I can create a visual representation (logo and slogan) that reflects my knowledge of how a cell operates like a factory.**

NATIONAL SCIENCE STANDARDS

1. **MS-LS1-2:**
   Develop and use a model to describe the function of a cell as a whole and the ways the parts of cells contribute to the function.

2. **MS-LS1-1:**
   Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

3. ***HS-LS1-2:***
4. ***Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.***

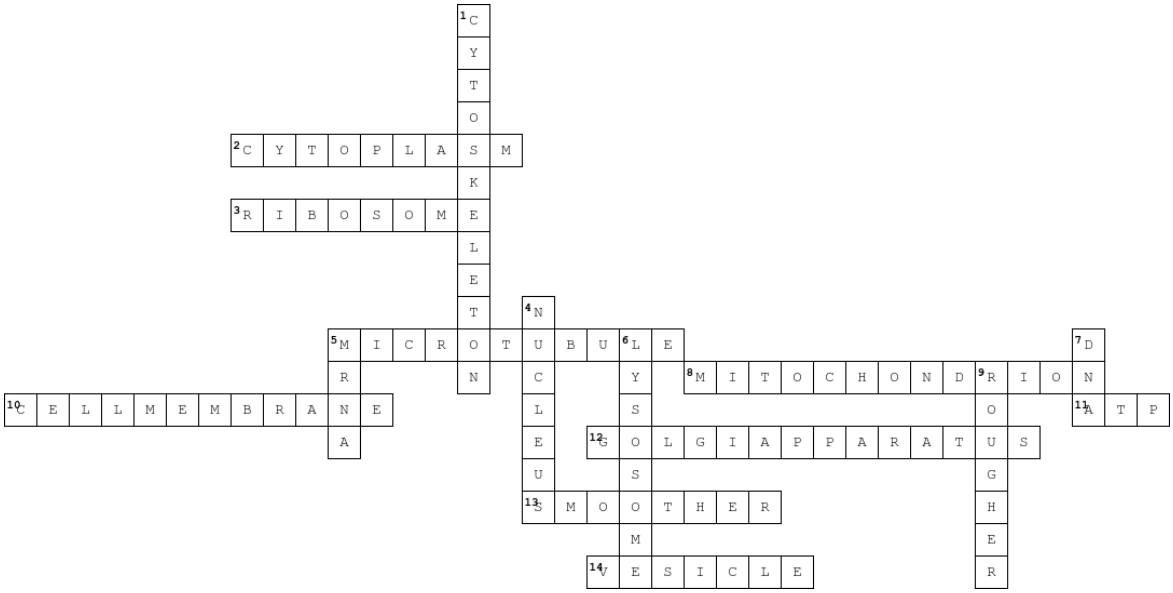
Answer Key

Comprehension:

1. It stores DNA and gives instructions, like a CEO runs a company.
2. Ribosomes make proteins and the rough ER transports them.
3. It produces ATP, the cell's energy source.
4. It packages and ships proteins and lipids.
5. Varies—should connect the organelle's function to a factory role.

True/False:

1. False
2. True
3. True
4. False
5. True



Multiple Choice:

1. b
2. c
3. b
4. c
5. a
6. b
7. b
8. a
9. b
10. c
11. b
12. a

Smith
Biology

Name _____

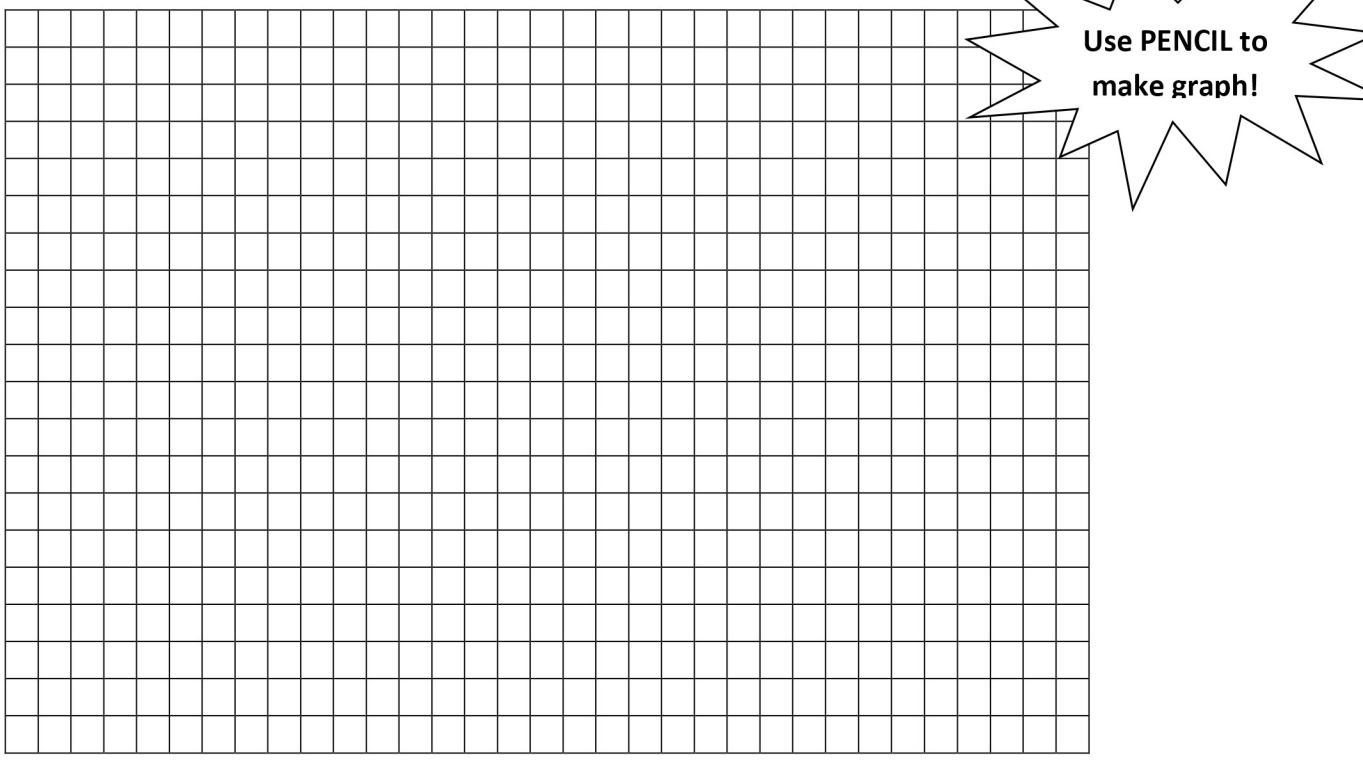
Graphing Practice

Practice Problem #1

Background: The thickness of the annual rings indicates what type of environmental situation was occurring the time of the tree's development. A thin ring usually indicates a rough period of development such as lack of water, forest fires, or insect infestation. On the other hand, a thick ring means a prosperous period of development. Use the information from the data table below to create a proper scientific graph and to answer the corresponding questions.

Age of Trees (in years)	Average Thickness of Annual Rings in Forest A (millimeters)	Average Thickness of Annual Rings in Forest B (millimeters)
10	20	24
20	24	28
30	30	35
35	34	38
50	41	45
60	46	51

1. What is the dependent variable? _____
2. What is the independent variable? _____
3. What was the average thickness of annual rings for 40 year old trees in Forest A? _____
4. What is it called when you make predictions within given data, such as made in question #3? _____
5. What was the mean thickness of annual rings for all trees found in Forest B? _____
6. Based on the data shown, what can be concluded about the comparative health of Forest A & B? _____
   _____
7. What type of relationship (constant, direct, or indirect) exists between the age of trees and the average thickness of the tree's rings? Explain. _____
   _____



Smith
Biology

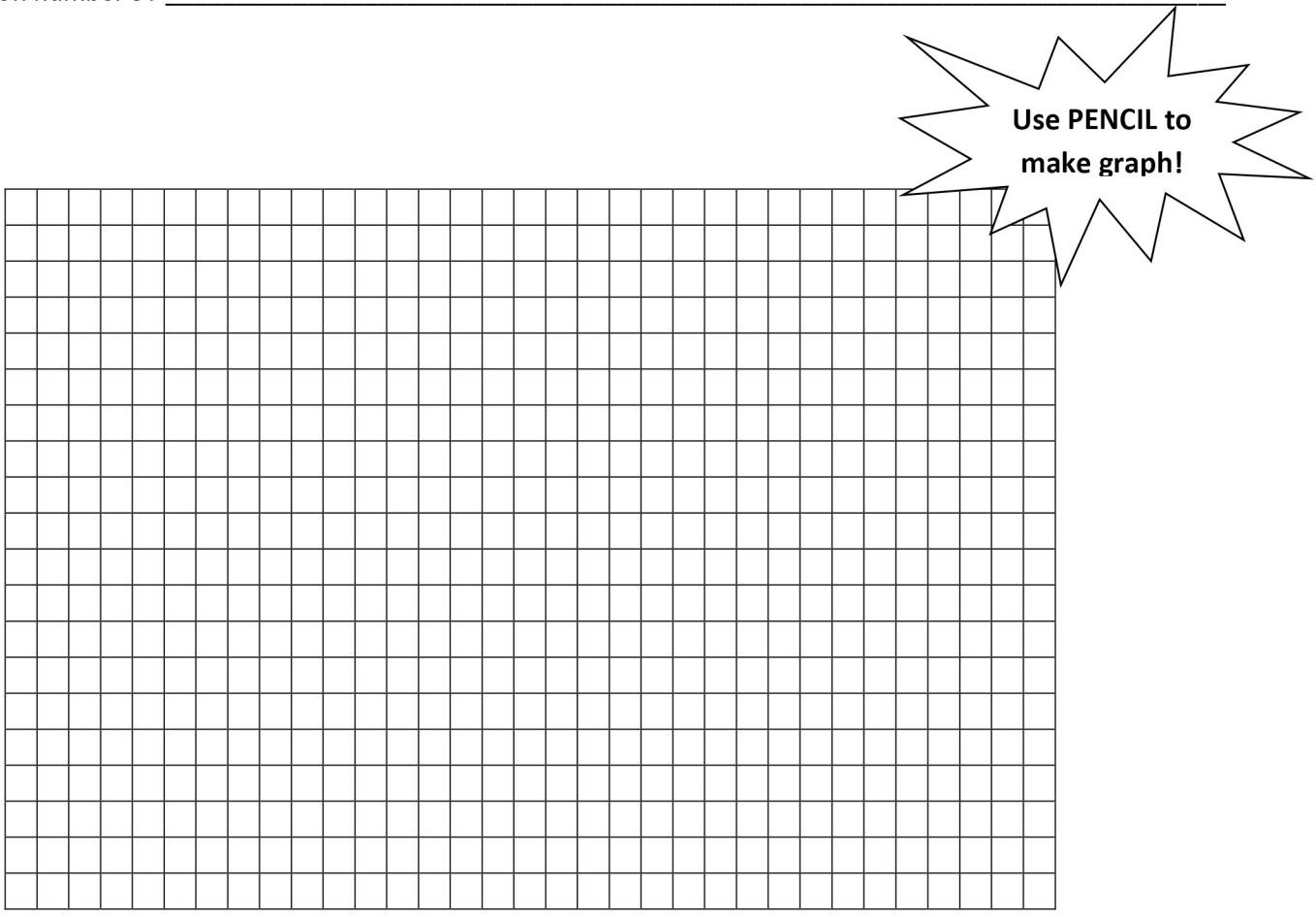
Name _____

Practice Problem #2

Background: Clams were placed into various temperatures of water. Use the information in the data table below in order to create a proper scientific graph and to answer the corresponding questions.

Water Temperature (°C)	Number of Developing Clams
15	72
20	92
25	120
30	140
35	99
40	72
45	36
50	0

1. What is the dependent variable? _____
2. What is the independent variable? _____
3. What is the optimum temperature for clam development? _____
4. What is the mean number of clams per sample? _____
5. Approximately how many clams would be developing in 10 degree Celsius water? _____
6. What is it called when you make predictions about data not yet recorded, such as the prediction we made in question number 5? _____



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Biology

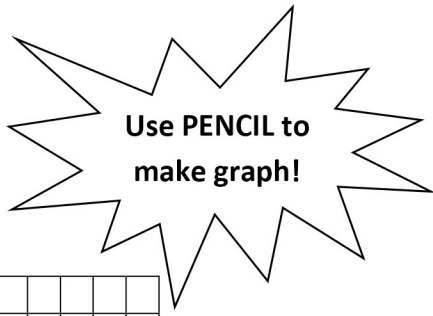
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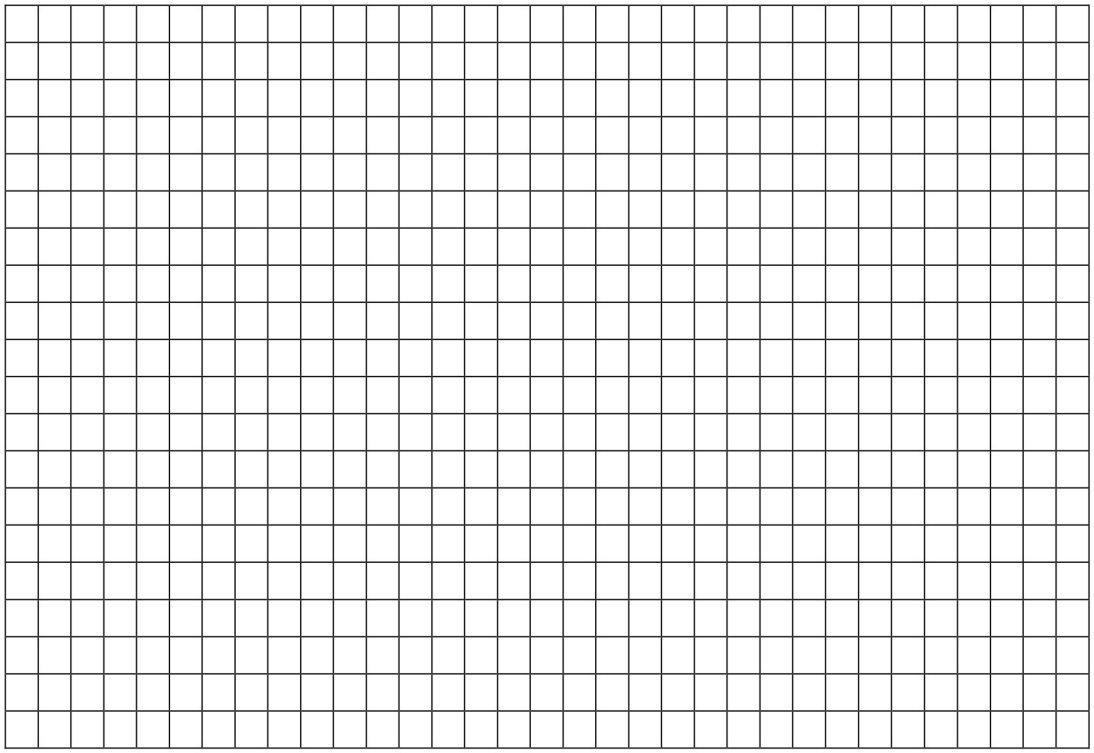
Practice Problem #3

Background: Natalie sets out to run 15 kilometers. Every 30 minutes she checked her pedometer to determine how far she had run. Use the data below to create a proper scientific graph and to answer the corresponding questions.

Time (minutes)	Total Distance (km)
0	0
30	6.8
60	10.1
90	12
120	13.3
150	15

1. What is the dependent variable? _____
2. What is the independent variable? _____
3. How many kilometers had Natalie run after 40 minutes? _____
4. What was Natalie's average speed (in kilometers per hour) over the course of her run? _____
   Use the formula Speed = Distance / Time



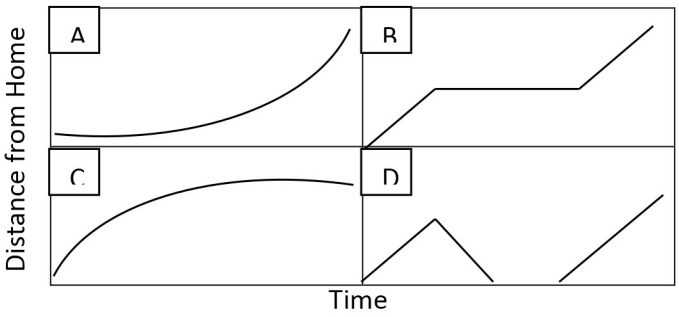


Smith
Biology

Name _____

Practice #4

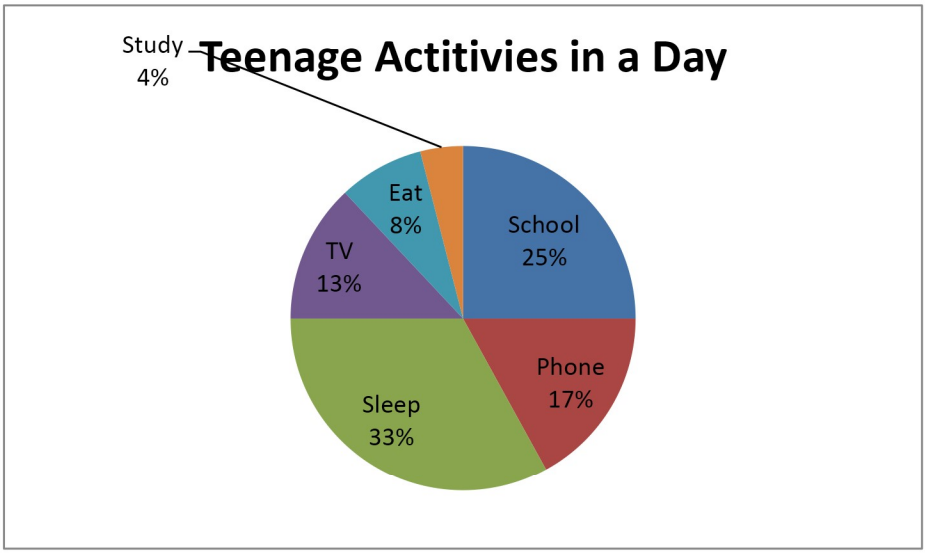
Background: Match each story on the left with the graph it represents on the right. Each graph compares the distance a car is from home compared to time.



____1. I had just left home when I realized I had forgotten my books, so I went back to pick them up.
____2. The battery on my electric car started to run down.
____3. Things went fine until I had a flat tire.
____4. I started out calmly, but sped up when I realized I was going to be late.

Practice Problem #5

Background: The pie chart shows the approximate percentages teenagers spend doing various activities in a day. Use the information in the pie chart to answer the questions below.



1. What percent of the day is spent watching TV? _____
2. How many hours are spent sleeping? _____
3. What activity takes up the least amount of time? _____
4. What activity takes up a quarter of the day? _____
5. What two activities take up 50% of the day? _____
6. What two activities take up 25% of the day? _____

Practice Problem #6

1. What is the dependent variable? _____
   _____
2. Does the price per bushel always increase with demand?
   _____
3. What is the quantity demanded when the price is $5 per bushel? _____
4. What is the price per bushel when the quantity demanded is 80? _____

