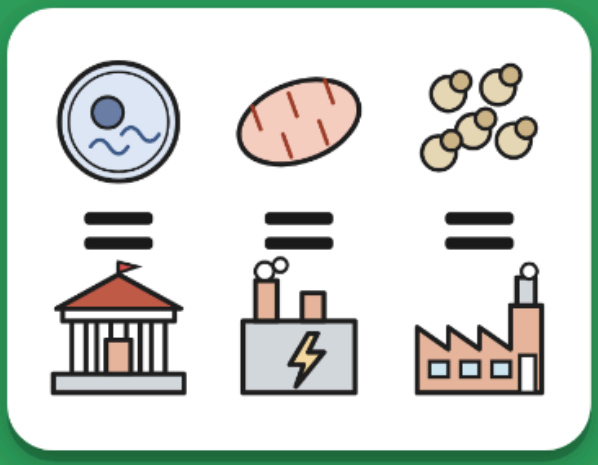
CELL CITY

PROJECT
GRADES 6-8

19 STUDENT PAGES




My name _____ Date _____

Job Cards 1

Cut out the job cards. Read each one.

Cut on the dashed lines: six cards, one cut down and two across. Keep the cards for your city project.

Nucleus
City job: Mayor
I keep the city plans and give the orders. In a cell, the plans are the DNA.

Cell membrane
City job: Gate guard
I check what comes in and what goes out of the city.

Cytoplasm
City job: Ground crew
I am the ground and air where every building sits. In a cell, I am a jelly-like fluid.

Ribosomes
City job: Factory worker
I build the products the city needs. In a cell, the products are proteins.

Bright Path Sped

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- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- The name line, every answer box, every ruled work box and every check box on the student pages are type-in fields, and so are the rubric, tracker, class grid and family page. You can also print any page and write by hand.
- It works offline. No account, no subscription, no internet connection needed after you download it.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart and the cards stay their full size. Every student page is black and white inside a colored border, so it still reads when copied in black and white.

Student work

A filled-in tracker, class grid or rubric carries a real student's name. Keep it in the data folder, and use a first name only on any page that leaves your hands.

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PREVIEW

How To Run Cell City

The parts of a student page, then one way to spread the unit across a week. Change the order to fit your own pacing.

The parts of a page

- **The answer box.** A bordered box for a letter or a word. Click it to type, or print and write in it.
- **The ruled work box.** Lines 0.34 inch apart for sentences. Write one idea to a line.
- **The check box.** True or false, yes or not yet: click or mark.
- **The word bank.** A box of words to use. Some words are used once and some not at all.
- **The job cards.** Six cards to a sheet, each 3.5 by 2.45 inches, edge to edge: one cut down and two across.
- **The cut-and-paste mats.** Six pieces in a 3 by 2 grid, each 2.4 by 1.15 inches: one cut across and two down.

A week that could work	Focus	Pages
Day 1	Read and learn	Pages 5, 6, 7; cut out the job cards (pages 11, 12).
Day 2	Match the analogy	Pages 8, 9, 10.
Day 3	Sort the functions	Pages 13, 14, 15 and 17.
Day 4	Apply and explain	Pages 16, 18; start the plan page (19).
Day 5	Design and check	Map page (20), quizzes (21, 22), reflection (23).

Untimed, unscored on the page

No student page has a timer or a score on it. The keys, the rubric and the tracker are for you. The answer keys are on pages 24 to 26; the project rubric is on page 27.

Writing pages have no one right sentence

The analogy charts, the city emergency and the reflection ask for reasons. The keys (pages 24 and 25) say what to look for. Accept any answer that ties the organelle's job to the city part's job.

Printing and the type-in fields

Every page prints clean in black and white. The name line, every answer box, every ruled box and every check box are type-in fields in any PDF reader: click one, type, then save. This is a fillable PDF, not a slideshow or a word-processor file.

The project

Students plan a city on page 19, then draw it with a labeled key on page 20. A plant cell also needs a solar farm and a city wall. The job cards are the students' reference while they design.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Reading 1: Welcome to Cell City

Read about Cell City. Then answer.

Welcome to Cell City

An **analogy** compares two things that are different but work in the same way. A cell is like a busy city. A city has a **city hall** that keeps the plans, a **power plant** that makes energy, **factories** that build products, a **post office** that sorts and ships packages, and a **recycling center** that cleans up. A cell has parts that do the same jobs. These parts are called **organelles**. The nucleus is like city hall. Mitochondria are like the power plant. Ribosomes are like factories. Because each part has its own job, the whole cell works like one well-run city.

Main idea: What is this reading mostly about?

Check what you read. Write the letter in the box.

1. What is an analogy?
   - **A** A comparison of two different things that work alike
   - **B** A very small part of a cell
   - **C** A kind of building in a city

2. In Cell City, the nucleus is like which part of a city?
   - **A** The power plant
   - **B** City hall
   - **C** The recycling center

3. What are the parts inside a cell called?
   - **A** Analogies
   - **B** Factories
   - **C** Organelles

PREVIEW

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My name _____ Date _____

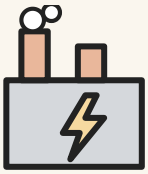
City Guide 2

Read the guide. Use it all week.

 = 

Golgi apparatus = Post Office

A stack of flat sacs. It sorts and packages proteins and other materials and ships them where they are needed.

 = 

Mitochondria = Power Plant

Release energy from food in a form the cell can use. Cells that use a lot of energy have many.

 = 

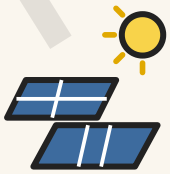
Vacuole = Warehouse and Water Tower

A sac that stores water, food and wastes. A plant cell has one large vacuole that helps keep it firm.

 = 

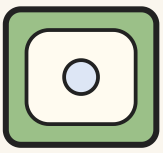
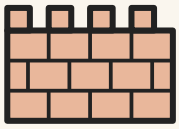
Lysosome = Recycling Center

A small sac of enzymes that breaks down worn-out parts, waste and food. Lysosomes are common in animal cells.

 = 

Chloroplast = Solar Farm

Captures light energy and uses it to make sugar (photosynthesis). Found in plant cells and in algae.

 = 

Cell wall = City Wall

A stiff layer outside the cell membrane. It supports and protects the cell. Plant cells, fungi and bacteria have one.

Pick one pair. Tell how the cell part and the city part are alike.

PREVIEW

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My name _____ Date _____

Analogy Chart 1

Write why each pair is alike.

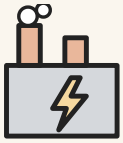
Look at the City Guide (pages 6 and 7). Write why each pair is alike.



Nucleus =  City Hall

They are alike because



Mitochondria =  Power Plant

They are alike because



Ribosomes =  Factory

They are alike because



Golgi apparatus =  Post Office

They are alike because



Vacuole =  Warehouse and Water Tower

They are alike because



Lysosome =  Recycling Center

They are alike because

PREVIEW

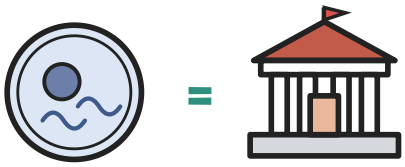
Preview · Bright Path Sped

My name _____ Date _____

Job Cards 1

Cut out the job cards. Read each one.

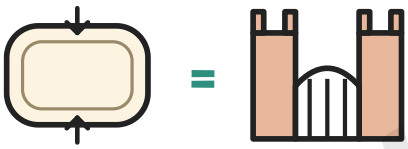
Cut on the dashed lines: six cards, one cut down and two across. Keep the cards for your city project.



Nucleus

City job: Mayor

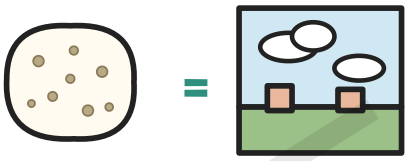
I keep the city plans and give the orders. In a cell, the plans are the DNA.



Cell membrane

City job: Gate guard

I check what comes in and what goes out of the city.



Cytoplasm

City job: Ground crew

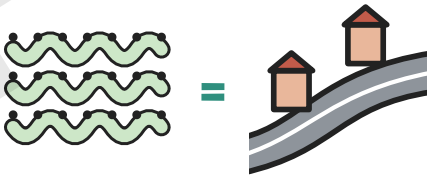
I am the ground and air where every building sits. In a cell, I am a jelly-like fluid.



Ribosomes

City job: Factory worker

I build the products the city needs. In a cell, the products are proteins.



Rough ER

City job: Truck driver

I carry new products along my road. Factories line my sides.



Smooth ER

City job: Road crew

I make oils (lipids) and carry goods along quiet roads with no factories.

PREVIEW

My name _____ Date _____

Function Sort 1

Cut out the six pieces. Paste each one in the right box.

Read each piece. Which organelle does each piece tell about?

Cell membrane	Vacuole	Chloroplast

Cut on the dashed lines: six pieces, one cut across and two cuts down.

Stores water, food and wastes	Captures light energy to make sugar	Controls what enters and leaves
A plant cell has one large one that helps keep it firm	A thin, flexible boundary around the cell	Found in plant cells and algae

Which piece was hardest to place? Why?

PREVIEW

My name _____ Date _____

City Jobs Sort

Cut out the six pieces. Paste each one in the right box.

Read each piece. Which kind of job does each city part do?

Control and Guard	Make and Power	Store and Clean

PREVIEW

Cut on the dashed lines: six pieces, one cut across and two cuts down.

Warehouse: stores supplies	City hall: keeps the plans	Power plant: makes energy
Recycling center: breaks down old things	City gate: checks what comes in	Factory: builds the products

Which piece did you move? Why?

My name _____ Date _____

Is the Analogy Right?

Is it true or false? Check one.

Check true or false. Does the city part match the cell part?

1. In Cell City, the nucleus is like city hall. ☐ true ☐ false

2. The cell membrane is like the power plant. ☐ true ☐ false

3. The Golgi apparatus is like the post office. ☐ true ☐ false

4. Ribosomes are like the recycling center. ☐ true ☐ false

5. Cytoplasm is like empty space with nothing in it. ☐ true ☐ false

6. The vacuole is like the warehouse that stores supplies. ☐ true ☐ false

Pick one false sentence. Fix it so it is true.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Plan My Cell City

Plan your own city. Write each building.

My city is called ☐

My cell is a ☐ **animal cell** ☐ **plant cell**

Think of a place you know, or make one up: a town, a school, a theme park. Write the building for each organelle. Then write what it does in your city.

Organelle	My building	What it does in my city
Nucleus Holds the DNA and directs the cell		
Cell membrane Controls what enters and leaves		
Cytoplasm Fluid that holds the organelles		
Ribosomes Build proteins		
Rough ER Makes and moves proteins		
Golgi apparatus Sorts, packages and ships		
Mitochondria Release energy from food		
Vacuole Stores water, food and wastes		
Lysosome Breaks down worn-out parts		
Chloroplast plant cells only		

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Quiz A

Pick the best answer. Write its letter.

Take your time. Guess if you are not sure.

1. Which organelle is like city hall?
   - A Nucleus
   - B Ribosomes
   - C Vacuole

2. Which organelle is like the power plant?
   - A Lysosome
   - B Mitochondria
   - C Golgi apparatus

3. Which part of a city is like the cell membrane?
   - A The warehouse
   - B The factory
   - C The city gate

4. Which organelle is like the recycling center?
   - A Chloroplast
   - B Lysosome
   - C Cell wall

5. Which organelle is like the post office?
   - A Nucleus
   - B Smooth ER
   - C Golgi apparatus

6. Which organelle is like the factories?
   - A Ribosomes
   - B Vacuole
   - C Cytoplasm

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Reflect on Cell City

Check what you can do. Then write.

1	I can tell what an analogy is.	☐ yes	☐ not yet
2	I can match each organelle to a city part.	☐ yes	☐ not yet
3	I can say what each organelle does in its job.	☐ yes	☐ not yet
4	I can tell how a plant cell is different (wall, chloroplast).	☐ yes	☐ not yet
5	I can design my own cell city.	☐ yes	☐ not yet

Where does the Cell City analogy work best?

Where does it not work? (A city is not alive. A cell is.)

If I added one more building to Cell City, it would be ____ because ____.

PREVIEW

Answer Key: True or False, Emergency, Quizzes

Accept any wording that fixes a false sentence. The emergency boxes have no single right sentence.

Is the Analogy Right? page 17

Item	Answer	The fix
17.1	True	-
17.2	False	The cell membrane is like the city gate. The mitochondria are like the power plant.
17.3	True	-
17.4	False	Ribosomes are like factories. The lysosome is like the recycling center.
17.5	False	Cytoplasm is a jelly-like fluid that holds the organelles, like the ground and air of the city.
17.6	True	-

City Emergency!: what to look for page 18

Item	Look for
1. Mitochondria	The power plant shuts down. The city would have no energy for its work. In a cell, nothing could be built or moved without usable energy.
2. Golgi apparatus	The post office closes. Packages would pile up with nowhere to go. In a cell, proteins would be made but not sorted, packaged or shipped.
3. Lysosome	The recycling center stops working. Trash and worn-out things would pile up. In a cell, worn-out parts and waste would build up.

Quizzes pages 21, 22

Item	Letter	Answer
21.1	A	Nucleus
21.2	B	Mitochondria
21.3	C	The city gate
21.4	B	Lysosome
21.5	C	Golgi apparatus
21.6	A	Ribosomes
22.1	B	Proteins
22.2	C	Chloroplast
22.3	A	It has no ribosomes on it
22.4	C	Water, food and wastes
22.5	B	Plant cells, fungi and bacteria
22.6	A	Each part has its own job, like parts of a city

PREVIEW

Cell City Project Rubric

For the teacher. Four parts of the design-your-own-city project.

Student _____ City name _____ Date _____

Part	4 points	3 points	2 points	1 point	Score
Organelles	All ten key organelles are in the city, each in a building that matches its job.	Eight or nine organelles are in the city with matching buildings.	Six or seven organelles are in the city.	Five or fewer organelles are in the city, or the buildings do not match their jobs.	
Reasons	Every reason ties what the organelle does to what the building does.	Most reasons tie the organelle's job to the building's job.	Some reasons are only a list of facts.	Few reasons are given, or they do not match the job.	
Map and key	The map is labeled, and the key matches every building on it.	The map is labeled; the key has one or two gaps.	The map or the key is partly done.	The map or the key is missing.	
Care	The city has a name, the work is neat, and it was checked against the guide.	The city has a name and the work is mostly neat.	The work is hard to read in places.	The work is unfinished.	

Total score (out of 16) _____ Next step for this student _____

How to use this page

- Score the plan page (page 19) and the map page (page 20) together, one row at a time.
- Four rows, four points each: the most a project can earn is 16.
- Write the number in the Score box. Use your own grading scale, or none: this page is for the teacher.

PREVIEW

Class Progress Grid

Every student on one grid: items right by kind of sheet, and the project total.

Class or group _____ Month _____

Student	Readings (of 6)	Who (of 8)	Charts (of 12)	Sorts (of 18)	True/false (of 6)	Quizzes (of 12)	Project (of 16)

PREVIEW

How to fill this in

For each column, add up how many items that student has right with no prompt (the tracker rows). The last column is the rubric total. One glance across a row shows which skill is easiest and which is next.

Grouping for small-group time

Students low in Readings or Who need the City Guide and the job cards first (pages 5 to 7, 11 and 12). Students low in Charts need the reasons talked through aloud before they write (pages 9 and 10). Students near full marks can move to the project (pages 19 and 20).

Priya's Tracker (Invented Student)

Priya S. is invented; nothing on this page describes a real student. The blank tracker is on page 28.

Student: Priya S. (an invented student)

Teacher: Mr. Okafor (invented)

Month: October

Page	Page type and set	Items	Right	Date	Notes
5	Reading 1: Welcome to Cell City	3	3	10/6	-
8	Who Works Here?	8	6	10/9	Swapped lysosome and vacuole
9	Analogy Chart 1	6	5	10/12	One reason was only a fact
10	Analogy Chart 2	6	-	-	-
13	Function Sort 1	6	6	10/14	-
14	Function Sort 2	6	-	-	-
15	City Jobs Sort	6	-	-	-
16	Reading 2: A Package Through Cell City	3	2	10/8	Mixed up the Golgi and the rough ER
17	Is the Analogy Right?	6	4	10/16	Thought cytoplasm was empty space
21	Quiz A	6	5	10/20	Mixed up nucleus and ribosomes
22	Quiz B	6	-	-	-

PREVIEW

How to read it

Priya S. has done **7 of 11** scored sheets and got **31 of 38** items right with no prompt. **2** sheets were all right and **5** carry a note. Every number comes from the table.

What the table points to

The lowest sheets are Reading 2: A Package Through Cell City (2 of 3) and Is the Analogy Right? (4 of 6). Those are where the next practice goes. The 4 sheets left blank are not tried yet, never wrong.