



REM5 Youth Innovation Lab PLUS

Section 5 Answer Key

Mission ISS

How fast does the International Space Station travel?

5 miles per second! The ISS orbits earth about every 90 minutes.

How many people have visited the ISS? Bonus: How many countries were those visitors from?

239 people from 19 countries have visited ISS.

How long does it take to get from earth to the ISS?

The flight takes as little as 6 hours.

Explore the Destiny Lab

What do astronauts use to exercise?

Bike, treadmill, weight lifting machine.

How do astronauts wash their hair in space?

They squirt water onto their hair and use no rinse shampoo to wash their hair. They don't rinse like we would with a bath or shower.

What is the Cupola?

It's a great observation area with large windows that astronauts use to observe earth.

What does the robotic workstation do?

It operates the robotic arm on the outside of the space station.

When astronauts drink a cup of coffee how does it look different from on earth?

Water is squirted into a bag with coffee in it and astronauts then drink the coffee from a straw.

Go on a Spacewalk

What are the ways to get around on a spacewalk?

Holding onto handrails or with your jet pack.

Explore

What does the JEM Airlock do?

It is where astronauts can move items from inside to outside of the space station. Basically, it's how they put things into space.

What is in the Columbus module?

Science experiments.

What is the purpose of MARES?

It measures muscle on the astronauts to see how their muscle changes in space.

Discover Egypt: King Tut's Tomb

In what year was King Tut's Tomb discovered?

1922

How old was King Tut when he died?

19

King Tut's full name is King Tutankhamun, which he gave himself after he was king. What does Tutankhamun mean?

"The living image of Amun"



What is a Sistrum?

An ancient Egyptian rattle.

Why were items such as necklaces buried with King Tut and other pharaohs?

In the hope that they would be carried on to the afterlife.

Why were model boats such an important part of someone's burial?

They were thought to have helped their spirit move into the afterlife.

History: Wonders of the World

Filled out table:

	India	Peru	Greece
Size	1,269,345 sq. miles	469,224 sq. miles	50,492 sq. miles
Capital	New Delhi	Lima	Athens
Population	1,296,834,042	31,331,228	10,761,523
Currency	Rupee	Nuevo Sol	Euro
Official Languages	Hindi, English, 21 More	Spanish, Quechua	Greek
Natural Feature(s)	Himalayan Mts, Ganges River, etc	Amazon River, Andes Mts, etc.	Aegean Sea, Mt. Olympus

Taj Mahal

How long did it take to build the Taj Mahal?

Construction took 11 years but it took another 10 years to complete finishing work.

What animal was used during construction?

1,000 elephants were used on the site during construction.



What material covers the domes in the Taj Mahal?

White marble.

Machu Picchu

What was the guard house called?

Wayrona.

Who lived in the royal sector?

Emperor Pachakuti's relatives who would have cared for his possessions as if he were still living.

What did the Incas worship?

They worshipped the mountains, which they believed controlled the weather and took care of crops and animals.

Why is it believed that Machu Picchu was built where it is?

It's believed that Incas built there to try to curry favor with the gods.

Where did workers spend half of their effort, according to the experience?

Engineers spent about half of their time designing and building underground surfaces so Machu Picchu could last forever.

Colossus of Rhodes

How tall is the Colossus of Rhodes statue?

108 feet

What was the common war ship in Rhodes?

Trireme, which had three banks of oars and was used to ram other ships.

When was the statue built?

280 BC



What was the main business in Rhodes?

It was a trading hub with many harbors. The city also specialized in bronze making and trading.

What was a Rhodes “restaurant” known as?

Thermopolium, which were similar to modern take-out restaurants.

Filled out Table

	Taj Mahal	Machu Picchu	Colossus
Country	India	Peru	Greece
When was it built?	1653	Approx. 1450	280 BC
What material is it made of?	White marble, Precious stones	Dry stone	Marble base, Stone blocks
How big is it?	3 acres, 240 ft tall	125 sq. miles	105 ft tall
What's its main purpose?	Mausoleum	City/Royal Estate	Victory Monument
Is it still in use?	Yes	No	No

Mysteries of China: The Great Wall

Is the Great Wall of China one big wall or multiple walls?

The wall is made up of many walls built over thousands of years.

What was the purpose of the wall?

Protect China from northern invaders.

Can you see the wall today?

Yes, you can walk on some sections of the wall today and it is one of the most popular tourist destinations in China.



The Great Wall

How many walls make up the Great Wall of China?

16

When was the last section of the wall finished and during what Chinese dynasty?

Ming Dynasty, finished in 1644

How far east does the wall extend?

The wall extends to the sea and a section called the Old Dragon's Head.

Why is the mortar between bricks white?

It contains sticky rice.

How did people on the wall signal that a threat was near?

Smoke signals would be sent up and continue tower by tower until it reached the garrison.

Who was the wall built to protect China from?

Primarily from nomadic invaders from the north.

Do all sections of the wall look the same today?

Some sections of the wall are in ruins while others are in very good condition and host thousands of people per day.

What is the terrain like for most of the Great Wall?

Most of the terrain is mountainous, particularly in the eastern half of the wall.

Forbidden City

How many emperors ruled from the city?

24 emperors



How high are the walls around the city?

10 meters

How much space does the city inhabit?

163,000 square meters?

Science: Genius Genetics

MENDELIAN GENETICS

What plant did Gregor Mendel experiment with?

Peas

What is an allele?

An alternate form of a gene

What does it mean for a trait to be dominant or recessive?

Dominant traits are present as long as there is at least one allele with that trait. Recessive traits only show up if both alleles share the trait the dominant trait will always override the recessive.



When thinking about Mendelian traits, one very useful tool is the Punnett square: https://en.wikipedia.org/wiki/Punnett_square

Check out the Punnett square below, where B is brown hair and the dominant trait while b is blonde hair and the recessive trait. What is the chance that Robert and Cersei's child is blonde?

Cross:

$BB \times bb$

		Robert	
		B	B
Cersei	b	Bb	Bb
	b	Bb	Bb

Zero

What would you change about Robert's side of the grid to give their child a 100% chance of being blonde?

Change both of his alleles to lowercase b.

CELL DIVISION

How many cells are there in the average human body?

About 10 trillion (10,000,000,000,000).

What is an organelle? Which organelle is concerned with cell division?

Specialized structures in cells. The nucleus.

How many genes are copied each time a cell divides?

About 20,000.

What are the four main phases of mitosis, in order? Draw each of them!

Prophase, metaphase, anaphase, telophase. There's a picture in the video, and many many reference images online.



GENETIC TESTING

What is DNA? What does it do?

Deoxyribonucleic acid. The genetic blueprint, it encodes proteins.

What are ATCG? Where are they found?

Nitrogen bases that make up the code. They are in the center of the strand. Bonus: They stand for adenosine, thymine, cytosine, and guanine.

What is a karyotype? What can you find by looking at it?

The set of chromosomes someone has. Can find chromosomal abnormalities.

What can you learn from a full genetic test?

Ancestry and possible health risks.

Can your genotype be used to make a medical diagnosis?

No, it can identify risks/possibilities, but it isn't a guarantee.

VIRTUAL FIELD TRIP

What does variation and inheritance allow a population to do?

Adapt to its environment.

Where did white grapes come from?

From eliminating a gene that produced the red tinge in grapes.

What are some other traits in the food you eat that you think might be the result of genetic modification by humans?

Lack of seeds, extra sugar for sweetness, size, ability to grow in new environments, etc.

