Ancient Chinese Technology

THE EMPEROR'S NEW IDEAS

Source: coca-cola.com.cn

In China, Coca-Cola is translated (kě kǒu kě lè), which means "can amuse your mouth".

RATIONALE

Ancient China was the technology center of the ancient world. Important innovations such as a writing system, paper, printing, gunpowder, the compass, porcelain and silk spread from China throughout the world. These innovations had a profound impact on the history of the world, and China was the most populous, richest, and most productive nation in the world. But just as Europe began to experience the awakening known as the Renaissance, China began to falter in innovation. Other nations took the advances the Chinese had created and improved them. China, while keeping its identity as a nation, declined in power and importance.

The two concepts explored in the unit, innovation and culture, were integral to China's identity as a nation. The Great Wall, although a failure as a defense, gave China and identity. What was inside the wall was China—what was outside was not. Since I was dealing with a class that did not know each other, I also wanted to provide an opportunity for my class to interact and learn about each other. My first lesson also allowed me to address my expectations for the students as a class. If the class could develop an identity, my job would be much easier. One of my process goals was for this new class to learn to work well together.

Although I had a good hook for my lesson on the Great Wall, I decided to proceed with the hook for the second day. The reason for this change was that I wanted to emphasize to the students that there would be surprises, unexpected events, and that the class would be fun. If the setting were not a summer camp, I definitely would have waited and introduced the Great Wall through the "Who is that at the Great Wall?" powerpoint. The analogy of a class to a wall is one I have used regularly through my years in teaching, where each brick in the wall supports the others in their purpose of learning. I think both the hook and the analogy were a success. Students had positive interactions throughout the week and maintained interest each day.

The skills I wanted students to exhibit most were thinking skills. I wanted them to experience the concepts we were studying in a hands-on manner, but I wanted them also to think about what they were doing. I think the lesson that best accomplished this goal was the Mandate of Heaven simulation. There was a great deal of history packed into the simulation, but it was also a fast-paced game which was fun for them to play. There was no direct lecture involved, and students did not have specific historic roles, but the simulation highlighted the concept involved and the gameplay covered the actual historical context in which the concept operated. At the end of the class in an informal assessment, students exhibited exemplary understanding of the

concept. It opened my eyes to the possibilities of full-blown simulations in the classroom. One worry with simulations is that students will be so caught up in the simulation that they will miss the concept or gloss over it. There was enough depth of subject matter ingrained in the game that this did not happen.

I wanted to do a Taba lesson as part of my unit because it would be student-led and would force students to think about the concepts using inductive reasoning. The medium I chose for this lesson, Chinese sayings which illustrated cultural values, required students to process the sayings for understanding, then look for the values behind the sayings. Originally I had looked at lists of inventions, but I think the sayings were a better fit to teach the concept of culture. Values such as the priority of education, the status of men and women in society, and the importance of the family became clear to students.

My last lesson was the most hands-on. Students received silkworm cocoons that had been boiled to loosen the threads and created compasses using magnets, needles, corks and bowls of water. Silk, a discovery of the Chinese, was extremely valuable to the Chinese as a trade good and fabric, while the compass was mainly used for feng shui, the beneficial location of buildings. The Chinese never fully realized the navigational value of the compass, which illustrates the point that the full value of innovations is often not realized by the culture which creates them.

The performance task for my unit was a Shark Tank pitch for one of the Chinese inventions. Students produce working models of wheelbarrows and crossbows, and made their pitches to the Emperor, who would have to decide on whether to commit his resources, and China's, to this invention. Presentations were very casual in nature, and outside of a summer camp setting, a rubric and a format for these pitches would be necessary. Very little class time was spent. Almost all work on the performance task was done at home.

DIFFERENTIATION

My unit was differentiated for gifted learners mainly by complexity and an accelerated pace. I was pleased, and sometimes frankly amazed, by how well the class moved from one activity to another. On the first day when we were reading fortunes, taking a "quiz", writing in Chinese, watching a video, analyzing a poem and discussing modern Chinese policy, I worried that we could not get it all done. A non-gifted class would not have completed all these activities because we would have lost time to transitions, social interactions, and play. My gifted students still interacted socially, but their interactions were on point about the activity. I was also concerned about

the last day. Even given two hours, compasses and silkworms and a performance task was a lot to attempt. They got it done.

Several complex ideas were also part of the unit. The first day we broached what gives a culture identity and the impact of the Great Wall on that identity. The second day was the Mandate of Heaven and the concept of legitimacy in government. Built into the game was a way for the Emperor to deal with disasters, but if the Emperor could not deal with them, he could lose his throne. Students also became experts on the particular provinces they were randomly assigned. River valleys were regularly flooded. Border provinces were invaded. Trade helped some provinces, but not others.

The most complex thinking took place during the Taba lesson, which was student led. I did provide an organizer to help students group the sayings. Groups worked in very different manners. One tried for understanding every saying before attempting to group anything. Another just wanted to group the sayings superficially based on word choices within the saying. The third group took a middle path. The saying that really threw them was "Women are long on hair, but short on knowledge." I did have to remind them that they were not judging the sayings or the values, but trying to determine them from the sayings. It was hard for them as rising 6th and 7th graders to accept this as a value without emotional reaction.

From the first moment my class entered, I wanted to challenge their preconceptions and allow them to learn as much as possible. The fortune cookie hook was to show that no one really knows everything about China and what many people think they know is wrong. Fortunes that they found in their cookies directly contradicted what I had just told them. One even said, "Mr. Black is an idiot!" I was glad I had extra fortune cookies because they wanted to make their own surprise fortunes to take home. The most challenging lesson for the students was the Taba lesson, which challenged their intellectual capacity, as not all the sayings were concrete examples, but also their ability to envision a society's values which differ from their own.

The unit also provided depth of ideas. For example, during the Great Wall lesson, students must analogize the Great Wall with the wall constructed by Robert Frost and his neighbor in "Mending Wall". We concluded class by discussing the computer firewall which the current Communist government maintains to keep unwelcome outside ideas from reaching many Chinese people. The simulation contained not just generic disasters, but actual situations from China's past which did not affect all regions equally so that the size and diversity of China were addressed.

My unit is designed for a middle school gifted class. I felt, and Brad agreed, that my students were genuinely gifted. Two of the girls were very quiet, one extremely so, but the quietest girl also did the best job on the performance task. It was a class of eight, which allowed a close, attentive atmosphere. Most of the activities could be adapted for a larger class. Nothing we did on the Great Wall could not have been done with a larger class. The simulation would have been broken up into teams and roles assigned within the teams. For the Taba lesson, more sets of sayings could be distributed. I have done the silkworms and compasses with middle school classes before. As I stated regarding the performance task, I would have added a rubric and a format which would provide a better fit with a more formal environment.

My class was balanced between boys and girls, four of each. The students were mainly upper middle to lower middle class, racially diverse, and varied in their prior knowledge. They were able to recognize several political figures, including Richard Nixon and the Clintons in the context of the Great Wall. Two were rising 7th graders, who had more prior knowledge about China than the others. The other six were rising 6th graders. They had high achievement levels and were successful in school. One girl, I was warned by her mother, was very shy. I believe her mother was worried that I would think she was not paying attention or was less intelligent. She was highly functional in the classroom, and though she seldom took part in discussions unless directly questioned, she did the best job of presenting during the performance task and probably got more out of the class than any other student.

GOALS AND OUTCOMES

Content Goals

The student will know:

- Which innovations were produced by ancient China;
- how the innovations produced by ancient China have influenced the history of China and world history;
- China's role as a center of innovation in the ancient world;
- Understand the terms Mandate of Heaven, innovation, discovery, culture and legitimacy.
- How innovation and/or technology transformed civilizations. State Essential Standards for Social Studies, 6.H.2.3.
-

Skills Goals

The student will be able to:

- Explain how and why some cultures have used modified and adapted to their environment; State Essential Standards for Social Studies, 6.G.1.4.
- Explain the origins and structures of various government systems. State Essential Standards for Social Studies, 6.C&G.1.1.
- Analyze how cultural expressions reflected the values of civilizations, societies and regions. State Essential Standards for Social Studies, 6.C.1.1.

Concept Goal

The student will understand the relationship between innovation and culture.

ASSESSMENT PLAN

PERFORMANCE TASK

Ancient Chinese Shark Hunt

As a civil servant of the Emperor of China, you have discovered a valuable new idea that will transform China forever. If you can get the Emperor's backing for your invention, you will become richer and more important than you have ever dreamed! Together with a partner, you will prepare a **pitch** for your invention. Things you might have invented:

- Silk
- The Great Wall
- Paper
- Gunpowder
- The Wheelbarrow
- Porcelain(china)
- Fireworks
- Paper money
- Printing
- Crossbows

Your pitch will be a presentation asking for a commitment on the part of the Emperor to support your idea. You will need to show: 1) the problem your invention addresses or solves. 2) How your invention or idea works. 3) How your idea will benefit China and its Emperor. 4) The infrastructure, investment, and manpower requirements for your invention. 5) Any problems you foresee that your invention might cause. You may use posters, computer presentations and images, and models for your presentation, but **you** must be able to answer the Emperor's questions regarding your idea. Give the wrong answer and you may lose the Emperor's funding, and your head!

The performance task met the goals by allowing students to research one innovation from ancient China and present a proposal to the Emperor. For this assessment students would have to know why the invention was important, what advantages it gave over previous methods or devices and the cost of this invention in investment, manpower and infrastructure. This would require study and research. Students would also have to know how the device worked, its components, and where to obtain the components. Several students chose to build models, but the assessment also allowed presentations, posters, or drawn images. There was ample room for creativity. As I stated before, a more formal presentation model and rubric would be necessary for a classroom project rather than a camp project.

TEACHER NAME	**Lesson #**
Ron Black	**1**

MODEL	CONTENT AREA	GRADE LEVEL
Question-based	**Social Studies**	**6**

CONCEPTUAL LENS	LESSON TOPIC
Innovation	**Great Wall of China**

LEARNING OBJECTIVES *(from State/Local Curriculum)*

6.H.2.2 Compare historical and contemporary events and issues to understand continuity and change.

6.G.1.1 Explain how the physical features and human characteristics of a place influenced the development of civilizations, societies and regions

THE ESSENTIAL UNDERSTANDING *(What is the overarching idea students will understand as a result of this lesson?*	THE ESSENTIAL QUESTION *(What question will be asked to lead students to "uncover" the Essential Understanding)*
Innovation impacts culture	***How does innovation impact culture?***

CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	PROCESS SKILLS (What will students be able to do as a result of this lesson?)
Students will understand the purpose of the Great Wall of China. Students will know how and why the Great Wall of China was built. Students will know about the Mongol invasion of China	**Student will be able to analyze poetry.** **Students will analyze a reading passage and compare similar structures using student-determined criteria.** **Students will be able to read and comprehend the article on the Great Wall at history.com. (http://www.history.com/topics/great-wall-of-china)** **Students will be able to evaluate the success of the Great Wall in preserving Chinese civilization.** **Students will be able to distinguish the present Chinese government's efforts to prevent political change.** **Students will be able to predict the efficacy of the Chinese government's programs.**

GUIDING QUESTIONS

What questions will be asked to support instruction?

Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
What is the purpose of a structure? **What do structures keep out?** **What do structures keep in?** **Why are structures built the way they are?** **Would the wall be as strong if the bricks were just piled one on top of the other?** **How does the placement of the bricks impact the structure of the**	**Who or what did the Great Wall keep out?** **Who or what did the Great Wall keep in?** **Was the cost in lives of constructing the wall justified?** **How could the loss of life during the construction of the Great Wall be justified?** **What does the phrase "Good fences**	**Was the Great Wall of China a success or a failure? In what ways was the GW of China a success?** **In what ways was it a failure?** **What other strategies could the Chinese have tried against the Mongols besides the Great Wall?** **If China had a different government, could the Great Wall have been constructed?** **How would the construction of the**

wall? The effectiveness of the wall? How is your class like a wall? Could you have a class with different students in it every day? What would that be like? How do classes fit together and change over time? What do well-structured classes keep in? keep out?	**make good neighbors" mean? Does the phrase "Good fences make good neighbors" apply to the Chinese and the Mongols? Who are the Chinese more like, the narrator of the poem or his neighbor? How did the Great Wall provide continuity to Chinese civilization? Did the Mongol conquest end the continuity of Chinese civilization or confirm it?**	**GW of China been impacted if China had a different government? Today the Chinese government carefully controls what Chinese citizens can see on the internet through a computer firewall. How is this strategy similar to the Great Wall? How is it different? Are these efforts an attempt to provide continuity to China's civilization or an attempt to stifle political change? How is it the same? How is it different?**

DIFFERENTIATION

(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.

Content	Process	Product	Learning Environment
The content of this lesson is differentiated by the complexity of the subject matter, in comparing poetry to the question of continuity of Chinese civilization and by comparing physical structures to human organizations such as classes. It is enriched by the depth of the ideas involved. Sophistication is added by comparing and contrasting the Great Wall to the present Chinese government's efforts to control internet access by its citizens.			

PLANNED LEARNING EXPERIENCES

(What will the teacher input? What will the students be asked to do? For clarity, please provide detailed instructions)

Engage and Connect - *This phase focuses on piquing students' interest and helping them access prior knowledge. This is the introduction to the lesson that motivates or hooks the students.*

Students will take a test based on pictures of famous celebrities at the Great Wall. Students will engage in teacher led discussion about walls in general and the purpose of walls. Students will provide answers from their own experience("keep out bugs and animals", "keep in warmth", "protect us"). Teacher will point out the way the wall is constructed, every brick depending on every other brick. Students will make bricks of their names to construct a wall of the class. How is your class like a wall? How is it different?

Great Wall of Mr. Black's Class-2015

Explore - *In this phase, the students have experiences with the concepts and ideas of the lesson. Students are encouraged to work together without direct instruction from the teacher. The teacher acts as a facilitator. Students observe, question, and investigate the concepts to develop fundamental awareness of the nature of the materials and ideas.*

Students will read the history.com article on the Great Wall of China and the poem "Mending Wall" by Robert Frost in small groups. Students will discuss questions:
Who or what did the Great Wall keep out?
Who or what did the Great Wall keep in?
Was the cost in lives of constructing the wall justified?
What does the phrase "Good fences make good neighbors" mean?
Does the phrase "Good fences make good neighbors" apply to the Chinese and the Mongols?
Who are the Chinese more like, the narrator of the poem or his neighbor?

Explain - *Students communicate what they have learned so far and figure out what it means. This phase also provides an opportunity for teachers to directly introduce a concept, process, or skill to guide students toward a deeper understanding.*
. Students will discuss questions:
Who or what did the Great Wall keep out?
Who or what did the Great Wall keep in?
Was the cost in lives of constructing the wall justified?
What does the phrase "Good fences make good neighbors" mean?
Does the phrase "Good fences make good neighbors" apply to the Chinese and the Mongols?
Who are the Chinese more like, the narrator of the poem or his neighbor?

Elaborate —*Allow students to use their new knowledge and continue to explore its implications. At this stage students expand on the concepts they have learned, make connections to other related concepts, and apply their understandings to the world around them in new ways*

Students will evaluate the success or failure of the Great Wall. It did not stop the Mongol invasion and China was conquered, but China retained its identity

Evaluate: *This phase assesses both learning and teaching and can use a wide variety of informal and formal assessment strategies.*

. Students will be asked about alternative strategies to the wall and postulate whether a different government such as a democracy would have come up with an alternative, or could even have had the wall built.

Students will compare the Great Wall to the internet firewall maintained by the Communist government of China today

TEACHER NAME			Lesson #
Ron Black			3
MODEL	**CONTENT AREA**	**GRADE LEVEL**	
Simulation	**Social Studies**	**6**	
CONCEPTUAL LENS		**LESSON TOPIC**	
Legitimacy		**The Mandate of Heaven in ancient China.**	

LEARNING OBJECTIVES *(from State/Local Curriculum)*

6.H.1 Use historical thinking to understand the emergence, expansion and decline of civilizations, societies and regions over time.
6.H.2.1 Explain how invasions, conquests and migrations affected various civilizations, societies and regions (e.g., Mongol invasion, The Crusades, the Peopling of the Americas and Alexander the Great).
6.H.2.2 Compare historical and contemporary events and issues to understand continuity and change.
6.H.2.3 Explain how innovation and/or technology transformed civilizations, societies and regions over time (e.g., agricultural technology, weaponry, transportation and communication).

THE ESSENTIAL UNDERSTANDING ***(What is the overarching idea students will understand as a result of this lesson?***	**THE ESSENTIAL QUESTION** ***(What question will be asked to lead students to "uncover" the Essential Understanding)***
Innovation impacts culture.	***How did innovation impact culture in China's government?***

CONTENT KNOWLEDGE **(What factual information will students learn in this lesson?)**	**PROCESS SKILLS** **(What will students be able to do as a result of this lesson?)**
The Mandate of Heaven was an early innovation in government which allowed a change in dynasty in China. A dynasty was thought to have the blessing of Heaven so long as China was free from natural disasters, revolts, plagues and foreign invasions. If these events occurred, it was because the gods had withdrawn their favor from the dynasty, and a new dynasty emerged through a revolt. Trade, agriculture, military force, a strong civil service and industry were important in ancient China. Ancient China was a large, diverse nation, whose central government was not always strong, giving rise to the saying "The mountains are high and the Emperor is far away.	**Students will be able to explain the concept of legitimacy in government.** **Students will be able to explain how the Mandate of Heaven was an early form of legitimacy.** **Students will be able to explain why dynasties came to power and lost power in China.**

GUIDING QUESTIONS
What questions will be asked to support instruction?
Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	**During Lesson Questions:**	**Post Lesson Questions:**

Why is the President the president? **Are all presidents elected?** **What gives government power?** **Are all governments the same?** **Who makes a king a king or an emperor an emperor?** **What kind of government did ancient China have?**	**What kind of problems did ancient China have?** **Why did dynasties end in ancient China?** **How were they replaced?** **Who decided whether a dynasty was legitimate?** **What factors contributed to a dynasty's power?** **What factors and events weakened a dynasty?** **What factors and events strengthened a dynasty?**	**If governments respond to their citizens during disasters, are they more legitimate?** **How did FEMA's response to Hurricane Katrina in New Orleans affect the legitimacy of our government?** **Would events like the shooting of Treyvon Martin and Michael Brown affect the legitimacy of government in the views of some citizens?** **If a government provides stability, but does not respond to the needs of its citizens, is it legitimate?**

DIFFERENTIATION

(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.

Content	Process	Product	Learning Environment
The concept of legitimacy in government is an advanced concept for sixth graders.	**The simulation requires students to assume a complex role as the leader of a province of China.**		

TEACHER NAME	Lesson #
Ron Black	**5**

MODEL	CONTENT AREA	GRADE LEVEL
Taba	**China**	**6-8**

CONCEPTUAL LENS	LESSON TOPIC
Values	**Confucianism, Chinese proverbs and sayings**

LEARNING OBJECTIVES *(from State/Local Curriculum)*

6.H.1.2 Summarize the literal meaning of historical documents in order to establish context.
6.H.1.3 Use primary and secondary sources to interpret various historical perspectives

THE ESSENTIAL UNDERSTANDING *(What is the overarching idea students will understand as a result of this lesson?*	THE ESSENTIAL QUESTION *(What question will be asked to lead students to "uncover" the Essential Understanding)*
Maxims reflect values.	***How do the maxims of ancient China reflect its values?***

CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	PROCESS SKILLS (What will students be able to do as a result of this lesson?)
Definition of a maxim or saying- a short, pithy statement expressing a general truth or rule of conduct. Importance of Confucius and maxims in Chinese culture Values of Ancient China including learning, morality, friendship, fate the status of women, age and the individual's place in society.	**Students will be able to give tell what a maxim is?** **Students will be able to examine a maxim for its meaning.** **Students will be able to work in groups to discuss the meaning and grouping of maxims.** **Students will be able to group maxims according to their understandings of their meaning.** **Students will be able to subsume groups of maxims.** **Students will be able to analyze maxims and extract meaning from maxims.** **Students will be able to extract values from maxims.** **Students will be able to**

GUIDING QUESTIONS

What questions will be asked to support instruction?
Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
What is a maxim? **What can maxims teach us about life?** **What is a popular maxim that you know?** **What does the maxim you know(and wrote) mean?** **What value is reflected in that maxim?** **Is the value in that maxim shared?** **Do you know where the maxim comes from?** **Have you ever heard of Confucius?** **If our maxims reflect our values, can maxims from other times and countries reflect their values?**	**How would you group the maxims?** **What labels would you give the groups of maxims?** **Why did you group them together?** **Could some maxims belong in more than one group?** **Are there any maxims that do not seem to fit in any group?** **If so, do you need any help in understanding the one that doesn't seem to fit?** **How can you regroup the maxims?** **Does any group seem to fit into another group?** **Can you group the maxims according to values?** **What values are reflected in the maxims?**	**What values were reflected in the maxims?** **Which values seemed similar to modern American values?** **Which values seemed different from modern American values?**

DIFFERENTIATION

(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.

Content	Process	Product	Learning Environment
Maxims deal with abstract concepts and the study of people. Students are required to organize the content for learning value.	**Interpreting and understanding sayings and maxims require complex thinking, exceptional reasoning ability, insightfulness, and a need to understand. Grouping these maxims requires applying learning across domains**		

	of understanding. The lesson is open-ended. Students are free to make their own groups of maxims which are different than mine. Students are expected to discover values out of maxims, and to work in groups to come up with these values,		

TEACHER NAME	**Lesson #**
Ron Black	**4**

MODEL	**CONTENT AREA**	**GRADE LEVEL**
Project Based	**Social Studies**	**6**

CONCEPTUAL LENS	**LESSON TOPIC**
Innovation	**Discovery of silk, Invention of compass,**

LEARNING OBJECTIVES *(from State/Local Curriculum)*

Social Studies Learning Objectives
6.H.1 Use historical thinking to understand the emergence, expansion and decline of civilizations, societies and regions over time.
6.H.2 Understand the political, economic and/or social significance of historical events, issues, individuals and cultural groups.
6.G.1.2 Explain the factors that influenced the movement of people, goods and ideas and the effects of that movement on societies and regions over time (e.g., scarcity of resources, conquests, desire for wealth, disease and trade).
6.G.1.4 Explain how and why civilizations, societies and regions have used, modified and adapted to their environments (e.g., invention of tools, domestication of plants and animals, farming techniques and creation of dwellings).
Science Learning Objectives
7.P.1.2 Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets).
7.L.1 Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life.

THE ESSENTIAL UNDERSTANDING *(What is the overarching idea students will understand as a result of this lesson?*	**THE ESSENTIAL QUESTION** *(What question will be asked to lead students to "uncover" the Essential Understanding)*
Innovation impacts culture	***How does innovation impact culture?***

CONTENT KNOWLEDGE (What factual information will students learn in this lesson?)	**PROCESS SKILLS** (What will students be able to do as a result of this lesson?)

Discovery and importance of the manufacture of silk in China. Invention of the magnetic compass in China.	**Students will be able to explain how silk is obtained from silkworm cocoons.** **Students will be able to obtain raw silk from cocoons.** **Students will be able to use raw silk to create an article of jewelry, artwork or handicraft.** **Students will be able to create a simple magnetic compass using a magnet, needle, cork and bowl of water.** **Students will be able to explain why a compass works.** **Students will be able to navigate a simple orienteering course using the compass of their own manufacture.**

GUIDING QUESTIONS

What questions will be asked to support instruction?

Include both "lesson plan level" questions as well as questions designed to guide students to the essential understanding

Pre-Lesson Questions:	During Lesson Questions:	Post Lesson Questions:
Phase I Questions **What is the difference between an invention and a discovery?** **Why is a discovery an innovation?** **Why was silk manufacture a discovery rather than an invention?** **What opportunities did silk manufacturing create for the Chinese people?** **What impact did these opportunities have for the people of China?** **Phase II Questions** **How is the Earth like a chocolate covered cherry?** **Why does a compass needle point north?** **Was the compass a discovery or invention? Why or why not?** **What opportunities did the innovation of the compass create for the Chinese people?** **How would these opportunities impact their culture?** **What opportunities did the Chinese miss from the lack of the use of the compass for navigation?**	**Phase I Questions** **What needs to be done to the cocoons to make silk?** **How difficult is it to remove the silk?** **What can you make with the raw silk?** **How much silk do you think it would take to make a robe? A shirt?** **Phase II Questions** **What is the purpose of the water in the bowl?** **Can you find your way using the compass you made?** **What drawbacks are there to this design?**	**How can a discovery be a more important innovation than an invention?** **What are the cultural consequences of fully exploiting an innovation?** **What are the cultural consequences of failing to fully exploit an innovation?** **How does innovation create opportunity?** **How does innovation impact culture?**

DIFFERENTIATION

(Describe how the planned learning experience has been modified to meet the needs of gifted learners. Note: Modifications may be in one or more of the areas below. Only provide details for the area(s) that have been differentiated for this lesson.

Content	Process	Product	Learning Environment

Innovation and discovery are similar abstract concepts that require higher order thinking to differentiate.	**All activities in this lesson are hands-on activities with real world connotations. Actual silk cocoons. Making compasses in the Chinese method. Students will be allowed to fail the orienteering test.**	**Students will self-select their product to make with silk**	
Highly engaging content	**Hands-on learning activities**	**Self-Selected**	**Highly Mobile**

Unit Resources

Powerpoint Great Wall

English to Chinese Alphabet

Paints, brushes

Foamboard blocks or posterboard slats for names in Chinese

"Mending Wall" by Robert Frost

http://www.history.com/topics/great-wall-of-china)
Great Wall video at History.com

Fortune Cookies

Game supplies-

- General—dice, chips.
- Emperor's crown
- List of Rules
- Province cards for each player
- Deck of yin/yang cards-one per turn

List of Chinese Maxims-laminated and cut for class

Graphic organizer for maxims-posterboard

Silkworm cocoons, electric pot to boil water

Magnets, needles, bowls, cork to make compasses

Functioning compass

Adapted readings on Silk and Compass

The Emperor will receive 3 coins per turn in tax revenue from each player

At the beginning of the turn the Emperor will roll the dice to determine the goal for each province and turn over a yin/yang card.

Each province will roll a die to add to their categories.

Provinces will get 1 coin for every category where they meet the goal.

If a province runs out of money, the Emperor must fund them in the amount of 10 coins.

In the event of a disaster (and there will be a LOT of disasters), the Emperor will roll the blue disaster die. If the Emperor rolls a 5 or 6, the disaster is avoided and the Emperor reimburses the province for its losses. If the Emperor fails his roll, the provinces suffer the consequences and the Emperor gets a strike.

Three strikes and all provinces roll for a new Emperor. The new emperor gives the old emperor his province card, but the players keep their money.

Some yin/yang cards will remove the Emperor immediately.

The player with the most money at the end of the game wins.

THE MANDATE OF HEAVEN GAME

BEIJING

Beijing became the capital of China and the Emperor's home in 1420 under the Ming dynasty. The Emperor's palace, known as the Forbidden City, is located there. Most Chinese state owned governments are located in Beijing, which hosted the Olympics in 2008.

Government	6
Military	4
Religion	3
Trade	3
Agriculture	4

THE MANDATE OF HEAVEN GAME

INNER MONGOLIA

Inner Mongolia forms the border between China and the nomad Mongols to the north. It is the region of the Great Wall and is vulnerable to invasion. The land here is not as fertile as in the river valleys, but important trade routes pass through the region.

Government	4
Military	6
Religion	3
Trade	4
Agriculture	3

THE MANDATE OF HEAVEN GAME

MANCHURIA

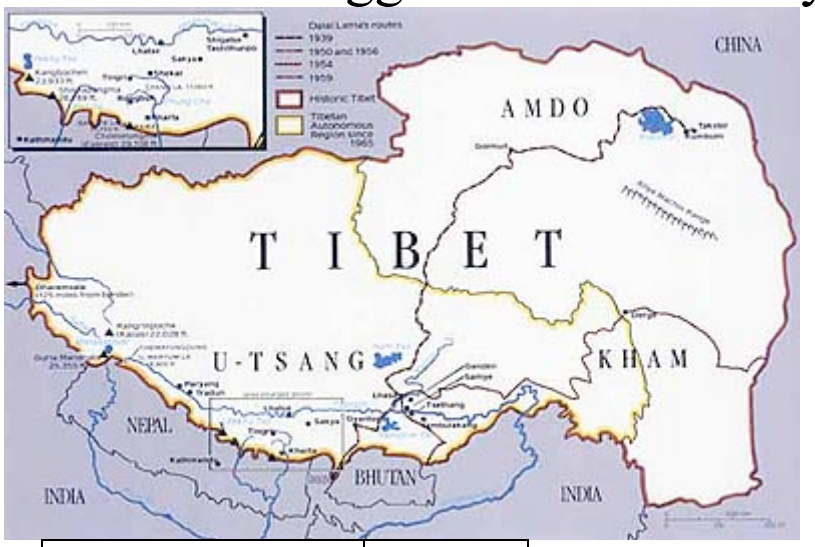
Manchuria, in the north of China is rich in coal and iron ore. The Manchu people were originally outside China. When they invaded China and became its last ruling dynasty of emperors, Manchuria became part of China.

Government	4
Military	4
Religion	3
Trade	5
Agriculture	4

THE MANDATE OF HEAVEN GAME

TIBET

Tibet is located on a high plateau adjoining the Himalaya Mountains in the south. For many years, Tibet was an independent country ruled by the Dalai Lama, a Buddhist religious leader. When China conquered Tibet in 1949, the Dalai Lama escaped. He continues to speak out against violence and aggression to this day.



Government	3
Military	4
Religion	6
Trade	5
Agriculture	2

THE MANDATE OF HEAVEN GAME

XINJIANG

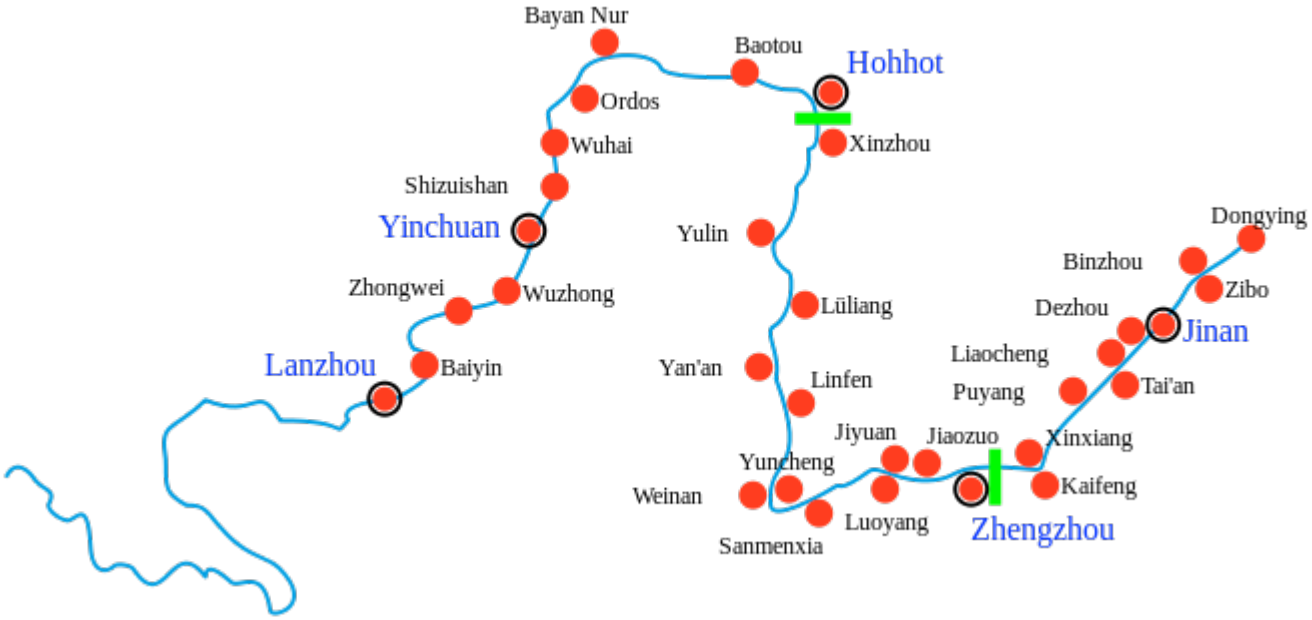
Xinjiang, in the west of China is very different from the rest of China. Many of the people are Muslim and speak languages related to Turkish. Important ethnic groups are the Kyrgyz, Uighurs, Tajiks, and Mongols. Recently so many Chinese from the east have moved into the region that they outnumber the original peoples. The region is drier than the rest of China.

Government	3
Military	5
Religion	3
Trade	5
Agriculture	4

THE MANDATE OF HEAVEN GAME

YELLOW RIVER VALLEY

The Huang He or Yellow River in the north of China is an important agricultural region. The river is nicknamed “China’s sorrow” because of frequent flooding. The river gets its name from the yellow soil washed away by its waters.



Government	4
Military	6
Religion	3
Trade	4
Agriculture	3

Famine All river valleys must pay in 3 coins	Flood All river valleys must pay in 10 coins
Earthquake!!! All territories pay in 5 coins.	Bountiful Harvest If your agricultural value is above 5, Collect double.
New Buddhist writings discovered! Collect double if your religious value is more than 4.	Japanese pirates raid the coast and river valleys. All these regions lose 5 coins.
The Great Wall is built. Any region with a military value of 5 or greater gets 3 extra coins this turn.	Rebellion! Your dynasty has been overthrown and lost the favor of Heaven.
Silk prices go up! If your trade value exceeds 5 collect 3 extra coins!	All students pass their civil Service exams. If your government value is 4 or above, collect 3 extra coins.

Famine All river valleys must pay in 3 coins	Flood All river valleys must pay in 10 coins
Earthquake!!! All territories pay in 5 coins.	Bountiful Harvest If your agricultural value is above 5, Collect double.
Confucius' philosophy becomes popular. Collect double if your religious value is more than 4.	Nomads raid Xinjiang and Inner Mongolia All these regions lose 5 coins.
The crossbow is invented. Any region with a military value of 5 or greater gets 3 extra coins this turn.	Genghis Khan invades. Your dynasty has been overthrown and lost the favor of Heaven.
Porcelain is invented! If your trade value exceeds 5 collect 3 extra coins!	The government begins to issue paper money. If your government value is 4 or above, collect 3 extra coins.

Famine All river valleys must pay in 3 coins	Flood All river valleys must pay in 10 coins
Earthquake!!! All territories pay in 5 coins.	Bountiful Harvest If your agricultural value is above 5, Collect double.
Missionaries arrive from India to spread Buddhist teachings. Collect double if your religious value is more than 4.	Nomads raid Manchuria and the Yellow River Valley. Both these regions lose 5 coins.
Gunpowder is invented. Any region with a military value of 5 or greater gets double coins this turn.	The Manchus invade to establish the Xing dynasty. Your dynasty has been overthrown and lost the favor of Heaven.
Paper is invented! If your trade value exceeds 5 collect 3 extra coins!	The secret of silk-making becomes known outside China. If your government or trade value is 4 or above, lose 5 coins.

Famine All river valleys must pay in 6 coins	Flood All river valleys must pay in 5 coins
Earthquake!!! All territories pay in 10 coins.	Bountiful Harvest If your agricultural value is above 5, Collect double.
The classic Buddhist novel "Journey to the West" is published. Collect double if your religious value is more than 4.	Rebellion in Tibet and the Pearl River Valley. All these regions lose 5 coins.
The fire lance, the first working gunpowder weapon, is invented. Any region with a military value of 4 or greater gets 6 extra coins this turn.	The British take over Hong Kong and disgrace you. Your dynasty has been overthrown and lost the favor of Heaven.
Printing is invented. If your trade value exceeds 5 collect 6 extra coins!	The government relocates the capital to Beijing. If your government value is 4 or above, collect 4 extra coins.

YELLOW RIVER VALLEY REVOLT AND ROLL FOR THE EMPIRE!	YANGTZE RIVER VALLEY REVOLT AND ROLL FOR THE EMPIRE!
INNER MONGOLIA REVOLT AND ROLL FOR THE EMPIRE!	MANCHURIA REVOLT AND ROLL FOR THE EMPIRE!
PEARL RIVER VALLEY REVOLT AND ROLL FOR THE EMPIRE!	TIBET REVOLT AND ROLL FOR THE EMPIRE!
XINJIANG REVOLT AND ROLL FOR THE EMPIRE!	To celebrate the expulsion of the Mongols, the Ming Dynasty declares a tax holiday!
The Emperor builds the Forbidden City. To celebrate, the Emperor decrees no taxes this turn!	Because of trouble from recent revolts, the Emperor can collect no taxes this turn.

The Mariner's Compass

The exact history of the compass, like that of gunpowder, is uncertain. The fact that house foundations in the recently excavated capital of the earliest historical Chinese dynasty, the Shang (1766?-1123? B.C.), are laid out according to magnetic north suggests a possible knowledge of magnetism at this early time. The first definite reference to magnetism, however, is found in a Chinese book completed about 240 B.C., which describes the lodestone as a stone that "summons or attracts iron." This statement and certain others in the same book may indicate Greek influence upon Chinese thought, coming through the Asiatic conquests of Alexander the Great. Thus there are hints of a knowledge of the lodestone in the works of somewhat earlier Greek writers.

A clear description of the magnetic compass itself, as distinct from the lodestone, occurs only about 1300 years later. It is found in a Chinese book written by a certain Shen Kua (A.D. 1030-94). His book contains a passage describing geomancers, a kind of fortuneteller long employed in China to determine the luckiness or unluckiness of proposed sites for buildings, graves, and other monuments. Shen Kua writes that such geomancers pursued their art by rubbing a lodestone against a steel needle, thus causing the needle to point south. (South is the primary direction for the Chinese, just as north is for us.) Such a needle, he adds, can then be floated on water, or, best of all, can be suspended from a thread. Shen Kua notes further — and this is remarkable — that the needle never points exactly to true south, but always deviates slightly. The knowledge here shown of the principle of magnetic deviation proves almost certainly that the compass had been long known and studied by the Chinese before Shen Kua's time.

In Shen Kua's description the compass is used only for magical purposes. In a Chinese book probably written shortly before 1125, we find the earliest clear account of the compass as used for actual navigation. The book describes the sea trade between China, the South Seas, India, and Western Asia. Since the Arabs played an important part in this trade, some people have thought that the Arabs rather than the Chinese first applied the invention of the compass to navigation. However, the earlier development of the compass in China itself, and the fact that the earliest references to it in Arabic literature are later than 1125, make it seem unlikely that the Arabs were its first users. What seems most probable is that the Arabs, coming to China in their ships, learned there of the Chinese methods of sailing by compass, and in their turn introduced the compass into Europe.

In Europe the compass is first mentioned in a French poem of 1190, but its application to navigation is mentioned only later. It was not until the fifteenth century that Europeans came to understand the principle of magnetic deviation about which Shen Kua had written some four hundred years earlier.

Ancient Chinese Shark Hunt

As a civil servant of the Emperor of China, you have discovered a valuable new idea that will transform China forever. If you can get the Emperor's backing for your invention, you will become richer and more important than you have ever dreamed! Together with a partner, you will prepare a **pitch** for your invention. Things you might have invented:

- Silk
- The Great Wall
- Paper
- Gunpowder
- The Wheelbarrow
- Porcelain(china)
- Fireworks
- Paper money
- Printing
- Crossbows

Your pitch will be a presentation asking for a commitment on the part of the Emperor to support your idea. You will need to show: 1) the problem your invention addresses or solves. 2) How your invention or idea works. 3) How your idea will benefit China and its Emperor. 4) The infrastructure, investment, and manpower requirements for your invention. 5) Any problems you foresee that your invention might cause. You may use posters, computer presentations and images, and models for your presentation, but **you** must be able to answer the Emperor's questions regarding your idea. Give the wrong answer and you may lose the Emperor's funding, and your head!