

*The*  
HISTORIAN'S  
APPRENTICE

# The Technological Triumphs of Tang and Song China

by Jonathan Burack

---

Each unit in *The Historian's Apprentice* series deals with an important historical topic. It introduces students to a five-step set of practices designed to simulate the experience of a historian and make explicit all key phases of the historian's craft.

## ***The Historian's Apprentice: A Five-Step Process***

**1. Reflect on Your Prior Knowledge of the Topic.**

Students discuss what they already know and how their prior knowledge may shape or distort the way they view the topic.

**2. Apply Habits of Historical Thinking to the Topic.**

Students build background knowledge on the basis of five habits of thinking that historians use in constructing accounts of the past.

**3. Interpret the Relevant Primary Sources.**

Students apply a set of rules for interpreting sources and assessing their relevance and usefulness.

**4. Assess the Interpretations of Other Historians.**

Students learn to read secondary sources actively, with the goal of deciding among competing interpretations based on evidence in the sources.

**5. Interpret, Debate and Write About the Topic Yourself.**

Students apply what they have learned by constructing evidence-based interpretations of their own in a variety of ways.

**Samples are provided for evaluation purposes. Copying of the product or its parts for resale is prohibited. Additional restrictions may be set by the publisher.**

MindSparks®

CULVER CITY, CALIFORNIA



©2010 MindSparks, a division of Social Studies School Service  
All rights reserved

Printed in the United States of America

MindSparks  
10200 Jefferson Boulevard, P.O. Box 802  
Culver City, CA 90232-0802  
United States of America

(310) 839-2436  
(800) 421-4246

<http://mindsparks.com>  
[access@mindsparks.com](mailto:access@mindsparks.com)

Only those pages intended for student use as handouts may be reproduced by the teacher who has purchased this volume. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means—electronic, mechanical, photocopying, recording—without prior written permission from the publisher.

ISBN: 978-1-57596-354-9  
Product Code: HS776 v2.0

# Teacher Introduction

## ★ *Teaching the Historian's Craft*

The goal of *The Historian's Apprentice* units is to expose students in a manageable way to the complex processes by which historians practice their craft. By modeling what historians do, students will practice the full range of skills that make history the unique and uniquely valuable challenge that it is.

Modeling the historian's craft is not the same as being a historian—something few students will become. Therefore, a scaffolding is provided here to help students master historical content in a way that will be manageable and useful to them.

Historical thinking is not a simple matter of reciting one fact after another, or even of mastering a single, authoritative account. It is disciplined by evidence, and it is a quest for truth; yet, historians usually try to

clarify complex realities and make tentative judgments, not to draw final conclusions. In doing so, they wrestle with imperfect sets of evidence (the primary sources), detect multiple meanings embedded in those sources, and take into account varying interpretations by other historians. They also recognize how wide a divide separates the present from earlier times. Hence, they work hard to avoid present-mindedness and to achieve empathy with people who were vastly different from us.

In their actual practice, historians are masters of the cautious, qualified conclusion. Yet they engage, use their imaginations, and debate with vigor. It is this spirit and these habits of craft that *The Historian's Apprentice* seeks to instill in students.

## ★ *The Historian's Apprentice: Five-Steps in Four Parts*

*The Historian's Apprentice* is a five-step process. However, the materials presented here are organized into four parts. Part I deals with the first two of the five steps of the process. Each of the other three parts then deals with one step in the process. Here is a summary of the four parts into which the materials are organized:

- Teacher Introduction.** Includes suggested day-by-day sequences for using these materials, including options for using the PowerPoint presentations. One sequence is designed for younger students and supplies a page of vocabulary definitions.
- Part 1.** A student warm-up activity, an introductory essay, a handout detailing a set of habits of historical thinking, and two PowerPoint presentations (*Five Habits of Historical Thinking* and *The Technological Triumphs of Tang and Song China*). Part 1 (including the PowerPoints) deals with *The Historian's Apprentice* Steps 1 and 2.
- Part 2.** A checklist for analyzing primary sources, several primary sources, and worksheets for analyzing them. Part 2 deals with *The Historian's Apprentice* Step 3.
- Part 3.** Two secondary source passages and two student activities analyzing those passages. Part 3 deals with *The Historian's Apprentice* Step 4.
- Part 4.** Two optional follow-up activities enabling students to write about and/or debate their own interpretations of the topic. Part 4 deals with *The Historian's Apprentice* Step 5.

## INTRODUCTION

### ★ *Suggested Five-Day Sequence*

Below is one possible way to use this *Historian's Apprentice* unit. Tasks are listed day by day in a sequence taking five class periods, with some homework and some optional follow-up activities.

**PowerPoint Presentation: *Five Habits of Historical Thinking*.** This presentation comes with each *Historian's Apprentice* unit. If you have used it before with other units, you need not do so again. If you decide to use it, incorporate it into the **Day 1** activities. In either case, give students the “Five Habits of Historical Thinking” handout for future reference. Those Five Habits are as follows:

- History Is Not the Past Itself
- The Detective Model: Problem, Evidence, Interpretation
- Time, Change, and Continuity
- Cause and Effect
- As They Saw It: Grasping Past Points of View

**Warm-Up Activity:** Homework assignment: Students do the “Warm-Up Activity.” This activity explores student memories and personal experiences shaping their understanding of the topic.

**Day 1:** Discuss the “Warm-Up Activity.” Then either have students read or review the “Five Habits of Historical Thinking” handout, or use the *Five Habits* PowerPoint presentation.

**Homework assignment:** Students read the background essay “Science and Technology in Tang and Song China.”

**Day 2:** Use the second PowerPoint presentation, *The Technological Triumphs of Tang and Song China*, to overview the topic for this lesson. The presentation applies the Five Habits of Historical Thinking to this topic. Do the two activities embedded in the presentation.

**Homework assignment:** Students read the “Interpreting Primary Sources Checklist.” The checklist teaches a systematic way to handle sources:

- Sourcing
- Contextualizing
- Interpreting meanings
- Point of view
- Corroborating sources

**Day 3:** In class, students study some of the ten primary source documents and complete “Source Analysis” worksheets on them. They use their notes to discuss these sources. (Worksheet questions are all based on the concepts on the “Interpreting Primary Sources Checklist.”)

**Day 4:** In class, students complete the remaining “Source Analysis” worksheets and use their notes to discuss these sources. Take some time to discuss briefly the two secondary source passages students will analyze next.

**Homework assignment:** Students read these two secondary source passages.

**Day 5:** In class, students do the two “Secondary Sources” activities and discuss them. These activities ask them to analyze the two secondary source passages using four criteria:

- Clear focus on a problem or question
- Position or point of view
- Use of evidence or sources
- Awareness of alternative explanations

**Follow-Up Activities** (optional, at teacher discretion):

Do as preferred: the DBQ Essay Assignment and/or the Structured Debate.

## ★ *Suggested Three-Day Sequence*

If you have less time to devote to this lesson, here is a suggested shorter sequence. The sequence does not include the PowerPoint presentation *Five Habits of Historical Thinking*. This presentation is included with each *Historian's Apprentice* unit. If you have never used it with your class, you may want to do so before following this three-day sequence.

The three-day sequence leaves out a few activities from the five-day sequence. It also suggests that you use only six key primary sources. Yet it still walks students through the steps in the *Historian's Apprentice* approach: Clarifying background knowledge, analyzing primary sources, comparing secondary sources, and debating or writing about the topic.

**Warm-Up Activity.** Homework assignment: Ask students to read or review the “Five Habits of Historical Thinking” handout and read the background essay “Science and Technology in Tang and Song China.”

**Day 1:** Use the PowerPoint presentation *The Technological Triumphs of Tang and Song China*. It overviews the topic for this lesson by applying the Five Habits of Historical Thinking to it. Do the two activities embedded in the presentation.

**Homework assignment:** Students read or review the “Interpreting Primary Sources Checklist.” The checklist teaches a systematic way to handle sources.

**Day 2:** In class, students study some of the ten primary source documents and complete “Source Analysis” worksheets on them. They use their notes to discuss these sources. We suggest using Documents 1, 2, 5, 6, 7, 9, and 10.

You may wish to make your own choices of primary sources. Use your judgment in deciding how many of them your students can effectively analyze in a single class period.

**Homework assignment:** Students read the two secondary source passages.

**Day 3:** In class, students do the two “Secondary Sources” activities and discuss them. These activities ask them to analyze the two secondary source passages using four criteria.

**Follow-Up Activities** (optional, at teacher discretion):

Do as preferred: the DBQ Essay Assignment and/or the Structured Debate.

## INTRODUCTION

### ★ *Suggestions for Use with Younger Students*

For younger students, parts of this lesson may prove challenging. If you feel your students need a somewhat more manageable path through the material, see the suggested sequence below.

If you want to use the *Five Habits of Historical Thinking* PowerPoint presentation, this sequence takes four class periods. If you do not use this PowerPoint, you can combine **Day 1** and **Day 2** and keep the sequence to just three days. We suggest using six primary sources only. The ones listed for **Day 3** are less demanding in terms of vocabulary and conceptual complexity. For **Day 4**, we provide some simpler DBQs for the follow-up activities.

**Vocabulary:** A list of vocabulary terms in the sources and the introductory essay is provided on page 7 of this booklet. You may wish to hand this sheet out as a reading reference, you could make flashcards out of some of the terms, or you might ask each of several small groups to use the vocabulary sheet to explain terms in one source to the rest of the class.

### SUGGESTED FOUR-DAY SEQUENCE

**Warm-Up Activity.** Homework assignment: Students do the “Warm-Up Activity.” This activity explores student memories and personal experiences shaping their understanding of the topic.

**Day 1:** Discuss the “Warm-Up Activity.” Show the *Five Habits of Historical Thinking* PowerPoint presentation (unless you have used it before and/or you do not think it is needed now). If you do not use this PowerPoint presentation, give students the “Five Habits of Historical Thinking” handout and discuss it with them.

**Homework assignment:** Ask students to read the background essay “Science and Technology in Tang and Song China.”

**Day 2:** Use the PowerPoint presentation *The Technological Triumphs of Tang and Song China*. This introduces the topic for the lesson by applying the Five Habits of Historical Thinking to it. Do the two activities embedded in the presentation.

**Homework assignment:** Students read or review the “Interpreting Primary Sources Checklist.” The checklist teaches a systematic way to handle sources.

**Day 3:** Discuss the “Interpreting Primary Sources Checklist” and talk through one primary source document in order to illustrate the meaning of the concepts on the checklist. Then have students complete “Source Analysis” worksheets after studying primary source documents 1, 2, 4, 6, 9, and 10.

**Homework assignment:** Students read the two secondary source passages.

**Day 4:** Students do *only* “Secondary Sources: Activity 2” and discuss it. This activity asks them to choose from among the sources the two that best back up each secondary source passage.

**Follow-Up Activities** (optional, at teacher discretion):

Do as preferred: the DBQ Essay Assignment and/or the Structured Debate.

Here are some alternate DBQs tailored to the six primary sources recommended here:

**Using these sources, explain why historians say that China was the most technologically advanced society of all by the year 1200.**

**“China was full of brilliant engineers and technically trained people, but the imperial government did not make the best use of them.” Do you agree or disagree with this statement. Why?**

## Vocabulary: The Introductory Essay

- **feudal:** Describes a social order stressing landholding and based on personal obligations between a lord and a vassal
- **Renaissance:** A time of renewed interest in classical learning in Italy and elsewhere in Europe in the 15th century
- **bureaucracy:** A clear organization of administration into numerous offices governed by formal rules
- **escapement:** A mechanism in a clock to keep the movement of the wheel at a perfectly even pace

## Vocabulary: The Primary Sources

- **celestial:** Having to do with the heavens or skies
- **ignition:** In this case, the setting on fire of an explosive fuel
- **weathercock:** A weather vane

## Vocabulary: The Secondary Sources

- **advent:** Arrival
- **autonomous:** Independent
- **implications:** Things that are implied, suggested, or inferred
- **interdictions:** In this case, things prohibited by law or legal authority
- **manifest:** Obvious
- **medieval:** Refers to a time in Europe when feudal relationships were prevalent in society
- **naturalistic:** In this case, realistic or in accord with nature or natural laws
- **predecessors:** Those who preceded or came before
- **synthesis:** Combining of elements or ideas into a complex and harmonious whole

## INTRODUCTION

# Part 1: China's Technology—Providing the Context

**Note to the teacher:** The next pages provide materials meant to help students better understand and evaluate this topic. The materials also seek to teach students the Five Habits of Historical Thinking.

This section includes the following:

- **PowerPoint presentation: *The Five Habits of Historical Thinking***  
 This presentation illustrates five habits of thought or modes of analysis that guide historians as they construct their secondary accounts of a topic. These five habits are not about skills used in analyzing primary sources (those are dealt with more explicitly in another handout in the next section). The Five Habits are meant to help students see history as a way of thinking, not as the memorizing of disparate facts and predigested conclusions. The PowerPoint uses several historical episodes as examples to illustrate the Five Habits. In two places, it pauses to ask students to do a simple activity applying one of the habits to some of their own life experiences.

If you have used this PowerPoint with other *Historian's Apprentice* units, you may not need to use it again here.
- **Handout: “The Five Habits of Historical Thinking”**  
 This handout supplements the PowerPoint presentation. It is meant as a reference for students to use as needed. If you have used other *Historian's Apprentice* units, your students may only need to review this handout quickly.
- **Warm-Up Activity**  
 A simple exercise designed to help you see what students know about the topic, what confuses them, or what ideas they may have absorbed about it from popular culture, friends and family, etc. The goal is to alert them to their need to gain a clearer idea of the past and be critical of what they think they already know.
- **Introductory essay: “Science and Technology in Tang and Song China”**  
 The essay provides enough basic background information on the topic to enable students to assess primary sources and conflicting secondary source interpretations. At the end of the essay, students get some points to keep in mind about the nature of the sources they will examine and the conflicting secondary source interpretations they will debate.
- **PowerPoint presentation: *The Technological Triumphs of Tang and Song China***  
 This PowerPoint presentation reviews the topic for the lesson and shows how the Five Habits of Historical Thinking can be applied to a clearer understanding of it. At two points, the presentation calls for a pause and students are prompted to discuss some aspects of their prior knowledge of the topic. Our proposed sequences suggest using this PowerPoint presentation after assigning the introductory essay, but you may prefer to reverse this order.



# Warm-Up Activity

## *What Do You Know About Chinese Civilization?*

This lesson deals with science and technology in the Tang and Song dynasties in China. Whenever you start to learn something about a time in history, it helps to think first of what you already know about it, or think you know. You probably have impressions, or you may have read or heard things about it already. Some of what you know may be accurate. You need to be ready to alter your fixed ideas about this time as you learn more about it. This is what any historian would do. To do this, study this illustration and take a few notes in response to the questions below it.



This photo shows part of the court of the Imperial Palace in the Forbidden City. How can you tell that this is a scene in China? Where is the Forbidden City?

China first invented the compass, gunpowder, woodblock printing, and wooden movable type? Does it surprise you to know that China did these things? Why or why not?

These inventions all appeared in China before or during the Tang and Song dynasties there (618–1279 CE). What else do you know about science and technology in China? Why do you suppose China led the world for so long in technology?