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however, both *Hanukkah* and *dreidel* could have been given their own group, items associated with Jewish holidays. *Eight days of celebration, candles, menorah, and gelt* could have been added to that list. Ms. Herchold and Ms. Quesnel could have chosen to continue working with conceptual hierarchies, but that activity would need to take place on another day. It would not be germane to their current purpose, which was to assess their students' prior knowledge about holidays.

### Stage 8: Summarizing Concepts

In Stage 8 of the Inductive Model, students synthesize the major points of all their lists into a single sentence. In addition to the content they include, this stage provides teachers with a quick assessment of students' facility in developing summary statements. Younger children who have not had much experience with this model often write statements that focus on individual groups rather than developing a summary of the entire set. This happened in Case Study 6.1. With greater exposure to the model and continued experience developing summaries, students can make statements that are more conceptually complex. Sometimes teachers are tempted to halt the inductive experience at this moment and provide instruction in writing a superior summary statement, but they should continue working inductively with students instead. Although there is some flexibility regarding some of the other stages of the Inductive Model, all Inductive Model lessons should end in this Stage 8 activity. The summary statements provided in Stage 8 serve as an assessment of students' conceptual understanding that will help their teachers make informed decisions about subsequent lessons.

In all stages of this model, an additional challenge for the teacher is to continue asking students questions to facilitate their thinking, as opposed to providing praise for "right" answers. There are no right answers in an Inductive Model lesson; there are only answers that students generate through their interactions. Holding back immediate positive reinforcement is not easy for teachers new to the Inductive Model.



### Case Study 6.2: Fifth Grade, Social Studies

#### Using the Inductive Model as Formative Assessment

The Inductive Model can also be used to assess collective student knowledge at any point in a unit. Used in this manner, the model can be an effective way to help students review unit content. As you read this last case study, consider how the sequenced questions of the model give the teacher a formative assessment.

Mrs. Pacheco teaches fifth grade in a large urban school. Her class has just finished studying the native populations in North, Central, and South America prior to European exploration and colonization. The current unit focuses on Europe in the 15th century during the Age of Exploration. When possible, Mrs. Pacheco has chosen to use reprints of

primary source documents, stories and novels, movies, documentaries, and Internet research in this unit, as well as the textbook.

The following benchmarks for upper elementary students helped inform Mrs. Pacheco's development of this unit:

Measure chronological time by decades and centuries.

Recount the lives of a variety of individuals who impacted the exploration, settlement, and colonization of the early Americas.

Trace the national origins of items and agricultural products and the trade flows that brought them to the United States. (Michigan Department of Education, 1996)

Mrs. Pacheco has found ways for her students to work with these benchmarks throughout the course of this unit, and the benchmarks will be strengthened in subsequent units as well.

In concert with those benchmarks, Mrs. Pacheco is using a **generalization** as a unifying theme for her students' yearlong examination of this period in history. A generalization is a statement that relates two or more concepts and provides a broad perspective. We call these statements generalizations rather than facts because they are generally true. The following generalization will be one focus of social studies this year:

All people, cultures, and religions have contributed to our cultural heritage—there has been much borrowing, trading, and diffusion of ideas, goods, and practices.

A number of concepts from the social studies make up this generalization: people; cultures; religions; cultural heritage; and borrowing, trading, and diffusion of ideas, goods, and practices.

In today's lesson, Mrs. Pacheco wants to assess her students' understanding of these objectives:

The learner will describe Europe in the 1400s and identify major reasons for exploration.

The learner will describe technological developments in the 1400s that supported global exploration.

The learner will summarize Spain's and Portugal's search for Asia and their subsequent settlements in North, Central, and South America.

Summarize the events and consequences of the French, English, and Dutch explorations.

Describe and evaluate the impact of European settlement on the native populations in the Americas.

Just as important, she wants to know how her students are thinking about what they have learned. This information will help her decide whether any material needs to be


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reviewed, what ideas most engaged the students' minds and hearts, and how she might proceed with the next lessons.

*Mrs. Pacheco:* We have been studying Europe in the 15th century during the Age of Exploration, a very exciting time and one not unlike our own time, with the advances in technology and space exploration. I want to get an idea of what has struck you as being important in our unit so far. This will help me plan for our next lessons. Let's spend a few minutes brainstorming what you have learned. I need two volunteers to write our list on the board. Brad and Jill? Please take turns writing down what you hear.

What comes to mind when you think of the Age of European Exploration? (*Over the next several minutes, the students participate enthusiastically, and they generate their list.*)

|                   |                   |                 |                 |
|-------------------|-------------------|-----------------|-----------------|
| Columbus          | Ferdinand         | Isabella        | trade           |
| Spain             | Portugal          | Marco Polo      | Italy           |
| cross-staff       | rudder            | lateen sails    | astrolabe       |
| Christianity      | Muslim maps       | Indians         | John Cabot      |
| French            | English           | rats            | 3 voyages       |
| shipbuilding      | caravels          | carrack         | Portugal colony |
| Prince Henry      | da Gama           | Dias            | Vespucci        |
| Cape of Good Hope | Nina              | Pinta           | scurvy gold     |
| Northwest Passage | spices            | salted foods    | silk            |
| Asia              | Australia         | bananas         | pineapple       |
| Coronado          | Cortes            | Balboa          | De Soto         |
| Magellan          | Aztec             | Inca Moctezuma  | Mexico          |
| Dutch             | Sir Francis Drake | Henry Hudson    | smallpox        |
| Verrazano         | Cartier           | South Pacific   | North America   |
| Canada            | South America     | Central America | chocolate       |
| houses            | pumpkins          | sugar cane      |                 |

As a vehicle for content review, the brainstorming step of the Inductive Model reveals to Mrs. Pacheco once again the strength of collaborative learning. Individual students are provided with an additional opportunity to review the unit material and make associations after hearing entries called out by their peers. She is not surprised that the students have listed so many items during the brainstorming, and she hopes the activity that comes next will reveal a complex understanding of how these items relate to one another.

Mrs. Pacheco followed the Inductive Model through Stage 4. The students placed the items in their list into these categories:

**List A**

Columbus  
Magellan

**List B**

expedition  
colony

**List C**

England  
France

da Gama  
Dias  
Polo  
Balboa  
Coronado  
Cortes  
Vespucci  
Verrazano  
Cartier  
Hudson  
Cabot  
Drake

**List D**

Indians  
Aztec  
Incas  
Moctezuma

**List G**

gold  
trade  
Asia  
spices  
silk  
territory  
spread of Christianity

expansion  
Mexico  
Peru  
West Indies  
Colombia  
Canada  
South America  
Central America  
North America  
Australia  
South Pacific

**List E**

3 voyages of Columbus  
caravels  
carracks  
rudder  
lateen sails  
shipbuilding  
Niña  
Pinta  
Santa Maria

**List H**

chocolate  
bananas  
pumpkins  
smallpox  
horses  
chickens  
sugar cane

Italy  
Spain  
Portugal  
Netherlands

**List F**

diseases  
smallpox  
scurvy  
food  
water  
rats

**List I**

cross-staff  
lateen sails  
caravel  
shipbuilding  
astrolabe  
rudder  
maps

As a result of grouping their entries, the class has a spirited discussion of 15th-century technology. They agree that lists E and I are very similar, as the sciences of astronomy and navigation and the craft of shipbuilding constituted much of the technological advancement of the 15th century. Mrs. Pacheco reminds the class that it is getting ahead of itself because the students have not yet found labels for each of the categories. As she moves into Stage 4, she divides the lists among small groups of students and asks them to come up with names that describe each list, to be reviewed by the full group. Her students come up with these labels:

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List A—Explorers

List B—Places explored

List C—Countries financing expeditions

List D—Native American populations

List E—Ships and voyages

List F—Problems on the voyages

List G—Reasons for exploring the New World

List H—Items traded between Europe and the New World

List I—15th-century technology

One student reminds the group that Italy did not actually finance voyages of its own. Italian sailors who wanted to explore often sailed for countries other than Italy, like Christopher Columbus and John Cabot. List C needs to be changed somehow. The teacher directs this problem to the class. Another student suggests that Italy be taken off the list. Perhaps a new list can be made for countries that provided sailors for expeditions.

Once this is addressed, Mrs. Pacheco asks whether the lists are now complete, whether any material should be added, or whether the lists should be changed in any other way. Various students make these observations:

List A could be subdivided by nationality of the explorer or by the country for which each explorer sailed.

List B also has subcategories that reflect more precise relationships, such as Canada's being part of North America.

List F contains "smallpox" as an entry, although smallpox was a problem for the native populations as a result of European exploration, not a problem on the expeditions for the explorers.

List H can also be divided between items brought to the New World from Europe (horses, chickens, etc.) and those coming from the New World to Europe (chocolate, bananas, etc.).

Mrs. Pacheco asks that List H be divided accordingly because this observation relates directly to one generalization she wants to reinforce through this unit of study: how borrowing, trading, and diffusion of ideas, goods, and practices have enriched our culture. She directs two students to take charge of separating the items on List H, and she asks the class to brainstorm additional things that belong on these two new lists. The group recalls these items:

|            |                |        |
|------------|----------------|--------|
| cattle     | pigs           | corn   |
| sheep      | potatoes       | squash |
| sugar cane | sweet potatoes | wheat  |
| tobacco    | tomatoes       |        |

A brief discussion helps students remember which items traveled in which direction across the Atlantic Ocean.

To bring closure to the lesson, Mrs. Pacheco asks small groups to come up with summary statements they might make about the Age of Exploration based on the material they have reviewed today. The groups record these statements to share with the class:

1. Many European countries sent sailors to explore and settle in the New World.
2. European explorers found native people already living in the new land.
3. Because they were not immune, the native people sometimes suffered from diseases that came from the European settlers.
4. Ships in the 15th century used state-of-the-art technology to promote the success of the voyages.
5. Countries and sailors had many reasons for wanting to explore new lands. The main reason was to find gold and bring back fancy goods.
6. In our lives, we use goods that the explorers took back to Europe and things that native people in the Americas learned about from the explorers.
7. Europe and the New World exchanged many goods and foods because of the explorations.

The nature of these statements, their amount of detail, and the level of their conceptual and factual accuracy provide Mrs. Pacheco with information that will help direct the next social studies lessons she teaches in this unit.

### Case Study 6.2: Post-Lesson Reflection

Mrs. Pacheco has mixed feelings about today's lesson. As in the first case study, using the Inductive Model as an assessment activity has provided her with a view of her students' understanding of the content of this unit. The stages of the model have allowed her to see not only what facts the students remember but also whether they have grasped the concepts so far.

When Mrs. Pacheco uses the Inductive Model at the beginning of a unit, students' responses are idiosyncratic; they rarely follow patterns. She has attributed this to her belief that as she assesses students' prior knowledge, the students are contributing directly from their individual experiences rather than from experiences mediated through

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shared instruction. Because she used the Inductive Model as a formative assessment today, she expected that her students' responses would follow a pattern during the brainstorming, for example the explorers, then countries, and so on. However, Mrs. Pacheco noticed at the beginning of this lesson that her students' responses did not fall into patterns. She will continue to think about this because she has no ready explanation.

As she reviewed the charts at the end of the lesson, she could see which of her unit objectives were reflected in the students' data. The brainstorming, categorizing, and naming included references to the reasons for explorations and technological developments in the 15th century. One aspect of the unit that did not surface today was the differences among the Spanish, Portuguese, French, Dutch, and English explorations. Because her students' grasp of this aspect is a foundation for the next part of the unit, the colonization of the New World, Mrs. Pacheco will consider how to revisit this material in a creative way as the class moves on to study European settlements in North America.

At one point in today's lesson, Mrs. Pacheco decided to intervene as her students were grouping their data. Because she wanted to prompt their thinking about the economic aspects of European exploration, she asked that List H be divided. She rarely steps into the action in Inductive Model lessons, but she chose to today to help herself plan for the next component of the unit. She wanted to see how her students were internalizing key ideas in economics. She was relieved to see that her actions did not stop the momentum of the lesson.

However, she believes it is important that they be able to differentiate among goods that were exchanged between the old and new worlds. Furthermore, it isn't enough for them to know in which direction the goods traveled; they also need to know why. She had hoped her students would provide more information or context for the items in List H, for example that chocolate and potatoes traveled east because they were not plants native to Europe.

Mrs. Pacheco was also disappointed in the summary statements written by the groups. With one exception, she does not think they were inclusive of the material her students have studied so far. Each one was an individual statement that could be sequenced to tell the story of the unit, as opposed to a summary statement that encompassed the major ideas in the whole unit so far. Summary statement number six came closest to the mark. In language arts, Mrs. Pacheco will spend time with her students reviewing how to write summary statements of longer text selections. She hopes that these improved skills will transfer to her students' work in social studies.

A quick glance at her benchmarks and objectives shows Mrs. Pacheco that her students are moving toward a solid, but still incomplete, grasp of the concepts and generalization in this unit to date. While their brainstorming list revealed recall of facts, her students' summary statements did not reflect the concepts she thinks are important. She knows that she needs to address these ideas again before moving to the next component of the unit.