

# Chapter 1

## Developing Learning Environments: *Planning Effective Lessons*



*How will I remember everything I need  
to do during a day?  
What if my students think my class is  
boring?  
How will I know if my students have  
learned anything?*

These are common fears of new teachers. Being prepared is the best way to overcome these fears. Even experienced teachers are faced with new curriculum, changing standards, and accountability issues. You need to know your children, your classroom, and yourself. What are the interests and abilities of your students? What strategies can you use to address their needs?

Careful planning will help you understand the needs of your students, design meaningful activities that will address those needs, and assess student progress to ensure learning. In this chapter, you'll learn to plan effective teaching/learning environments. You can't integrate technology into the classroom until you feel comfortable planning the teaching/learning environment as a whole. This book isn't intended to teach you everything you need to know about planning units and lessons. Instead it will review the basic skills you'll need to integrate technology into your lessons.

After completing this chapter, you'll be able to:

- Describe the teaching/learning process.
- Discuss the importance of communication in the teaching/learning process.
- Describe the role of experience in the teaching/learning process.
- Identify the characteristics of students and their implications.
- Describe the entry skills of students.
- Identify the purpose of instruction and educational outcomes.
- Write objectives.
- Describe the classroom teaching/learning environment.

- Design springboard activities that motivate students and help them recall prior learning.
- Design information exploration activities that help students learn concepts and build skills.
- Design student involvement activities that include practicing with feedback, solving problems, and creating projects.
- Design closure/transition activities that draw conclusions and help students transfer ideas to new learning situations.
- Evaluate and revise instructional materials.



#### Treehouse Tip

Learning is the development of new knowledge, skills, attitudes, and values.



### Exploring the Teaching/Learning Environment

Your classroom is more than walls, desks, tables, chalkboards, and computers. It's made up of thinkers, communicators, collaborators, and creators who use tools and resources to help them identify, organize, synthesize, and share information. You, your students, your resources, your activities, and your classroom are all active elements in an authentic teaching/learning environment. Your primary role is to facilitate learning by effectively arranging information and resources within the classroom environment. Learning is the development of new knowledge, skills, attitudes, and values.

In recent years our schools have moved toward a teaching/learning process that recognizes the importance of developing the whole child. The child's social, emotional, physical, and cognitive development are all of equal importance. As a result, many schools have developed inquiry-based, collaborative learning environments, and other learning experiences that address individual differences and enhance a child's development. An important element of these experiences is providing a learning environment for students where they can interact meaningfully with the people and information around them. According to Perkins (1990), a person is not a "pure and enduring nucleus, but the sum and swarm of participations."

Learning is a cultural phenomena based in economic, and social conditions. There is a growing movement toward authentic learning environments that require students to do "real world" kinds of activities as opposed to contrived exercises. In other words, rather than having students write three facts about bike safety, they might create safety videos, discuss bike safety with younger children, or start a "safe biking" campaign in the school.

Active, authentic learning environments require students to interact and participate through varied senses or channels of communication. They may watch, touch, smell, or listen. In addition, they may discuss, debate, synthesize, and create.

Technology can play an important role in conveying information through various channels and providing opportunities for student interaction, creativity, and communication. All kinds of media can be used to carry informational and instructional messages to learners. These media can be classified into print, display, and projected materials. Information, questions, directions, and feedback are just a few of the messages conveyed through the print medium. Print materials include books, handouts, worksheets, and other text and graphics materials. Students spend a lot of their instructional time working with print materials. However, teachers are increasingly passing up paper in favor of storing files electronically. Students may complete assignments using a word processor and store documents on a school network. Or, they may participate in online forums.

Display materials are another common classroom media format. These resources include signs, graphics, bulletin boards, chalkboards, table displays, games, models, and learning centers. Materials such as realia (real objects), construction paper, lab equipment, and many other items are arranged in a way to help facilitate learning. Displays can be explored and manipulated by students to provide an active, hands-on learning environment. Keep in mind that hand-held devices, laptops, and electronic keyboards may all be part of a learning center.

Projected materials have become an important media resource in the classroom. Traditional projected resources include transparencies, filmstrips, slides, and film. Current resources include DVD and streaming video from the Internet which are projected on a television monitor or computer screen. Computer-based resources are also found in this category such as informational, instructional, and creativity educational software as well as emerging information technologies such as Internet and virtual reality.

### Planning Units and Lessons

It's time to consider how you plan the teaching/learning environment. Teaching and learning can be exciting, stimulating, and lots of fun, but the process also requires lots of effort. For your teaching to be effective, careful planning is critical. In other words, you need to plan how you are going to "teach" the students in order to increase the chances that they actually "learn" what you teach and ultimately do what you want them to be able to do. In this context, "teach" involves preparation and implementation of an effective learning environment. Your role as teacher might include conducting large group activities, coordinating small group discussions, or monitoring individualized learning center exploration. In a learner-centered classroom, it's essential that you also focus on the role of children. Rather than



#### Treehouse Tip

##### ***Types of Materials***

Print  
Display  
Projected



### Treehouse Tip

#### **Types of Planning**

Course  
Unit  
Lesson  
Activity

always thinking about what you're going to teach, consider what students will be doing in order to learn. Will they be reading, listening, writing, drawing, talking, creating, reflecting, or doing? Students need to be actively "doing".

Course, unit, lesson, and activity planning will vary slightly depending on the grade level, content area, and type of course you're teaching. Secondary teachers tend to focus on courses, while elementary teachers focus primarily on units of instruction. Course planning generally includes the development of a syllabus that is used to guide the entire course. It includes a course description, goals and objectives, materials, outline, requirements, and a timeline. Units are subsets of courses and focus on a set of related goals and objectives.

Units are made of a series of short lessons. Your unit may take a day, a week, or a month depending on the amount of time and number of objectives. A central concept related to a topic such as earthquakes, exponential equations, or democracy is often the focus of a unit. A lesson should contain a single concept or series of related ideas. It may cover one or more objectives. Lessons help students reach particular objectives by providing information and activities to assist students in learning.

Many teachers like to use themes in their instructional units. Themes focus on a single topic that is of interest to students. It provides a core for group activities by building on the natural interests of students. Writing, speaking, listening, reading, calculating, and content-related concepts can all be taught within the context of a theme. Themes can provide relevance for students by drawing together concepts under a single umbrella. Themes attract and maintain student interest over a long period of time and can provide continuity for a series of activities.

A theme can be an effective way to motivate students during a unit, but make certain the theme is real rather than contrived. Consider the classic "PIGS" month theme I admit hosting in my elementary school many years ago. During reading month, PIGS stood for "Poke Into Good Stories". Pig books were displayed in the library and teachers created PIGS bulletin boards. Pigs were plastered on everything from worksheets to T-shirts. However, even second graders could see that the theme was only surface level. The pig on their "addition facts" worksheet had nothing to do with mathematics, and the pig song in music class was really just "Twinkle, Twinkle Little Star" with new words. Before long, the children became bored with pink pig pictures all over the building.

Rather than choosing a theme for the sake of having a theme, select a "focal point" for activities. Select a popular topic from the social studies or science area that has "interdisciplinary" possibilities. The environment, travel, social and health



issues, and historical events are a good place to start. Another approach is to begin with a popular video, website, CD, television show, or book that could be shared across grade levels.

A single video, website, or read-aloud book can serve as a focal point for the unit. It can provide a shared experience. Regardless of background, prior learning, or reading level, all of the students can share in the theme through a single experience. This can serve as the springboard or centerpiece for the entire unit. Consider promotional ideas that will keep the theme fresh and exciting. The length of the unit will depend on the number of outcomes as well as the number of activities you identify.

When considering themes, start with a list of topics that are of interest to a particular grade level. What are the popular television programs, movies, and fads? Now make a list of the standard content that is taught in the curriculum of this grade level. Do any of the student interests overlap with the required content? Are there ways that themes could be used to connect content with interests? For example, middle schoolers love television. You could use television commercials in your advertising unit or persuasive writing lesson. Go to our **42explore: Advertising** webpage for ideas ([42explore.com/advertis.htm](http://42explore.com/advertis.htm)).

Lessons can be designed that support skills across curriculum areas (i.e., social studies, science, mathematics, language arts, art, music), as well as develop important information skills. These lessons stimulate student curiosity by providing an in-depth look at a particular topic and relate it to real-world issues and concerns. Educators know that if you create the right conditions, learning will occur. Your job is to design an environment containing these conditions. Gagné, et. al (2004) developed the "events of instruction" to assist in developing effective teaching/learning environments. Their model includes nine important events as shown below:

- Gaining attention
- Informing learner of the objective
- Stimulating recall of prerequisite learning
- Presenting stimulus material
- Providing learning guidance
- Eliciting the performance
- Providing feedback about performance correctness
- Assessing the performance
- Enhancing retention and transfer

Dick, Carey, Carey (2004) developed a model for designing instruction that combined some of these events of instruction. For example, they combined gaining attention, informing the learner of the objective, and stimulating recall of prerequisite learning into what they call preinstructional activities. Present-



#### Treehouse Tip

##### **Themes**

provide relevance  
attract/maintain  
attention  
provide continuity





### Treehouse Tip

#### **Communication Factors**

Channel  
Noise  
Fields of Experience

ing the stimulus material is included in Information Presentation. Providing learning guidance, providing feedback about performance correctness, and assessing the performance are all included in Student Participation. Finally, Follow-through Activities include enhancing retention and transfer.

You'll be learning to create lessons that follow a similar lesson planning format. Keep in mind that there are hundreds of models for designing instruction. You need to find one that is comfortable for you and the way you teach. Some educators prefer a very formal lesson plan that contains practically everything that will be said and done in the classroom. Others prefer an outline or simply a list of ideas. Your approach will depend on your teaching style and experience as a teacher. As you gain experience, your planning style will evolve.

Lesson planning is based on the idea that with a well-designed learning environment and effective communication among the teacher and students, learning will occur. Communication theory provides an important foundation for understanding the teaching/learning process. Communication involves information being sent through some kind of signal and received at the other end (Schramm, 1954). The teacher and the student both act as senders and receivers depending on who originates the message (see Figure 1-1). The message is transmitted into a signal which can take many forms such as a printed page, spoken words, or a diagram on a screen.

Whether the message is received and understood depends on three primary factors. First is whether the channel of communication is a type that the receiver is able to interpret or un-

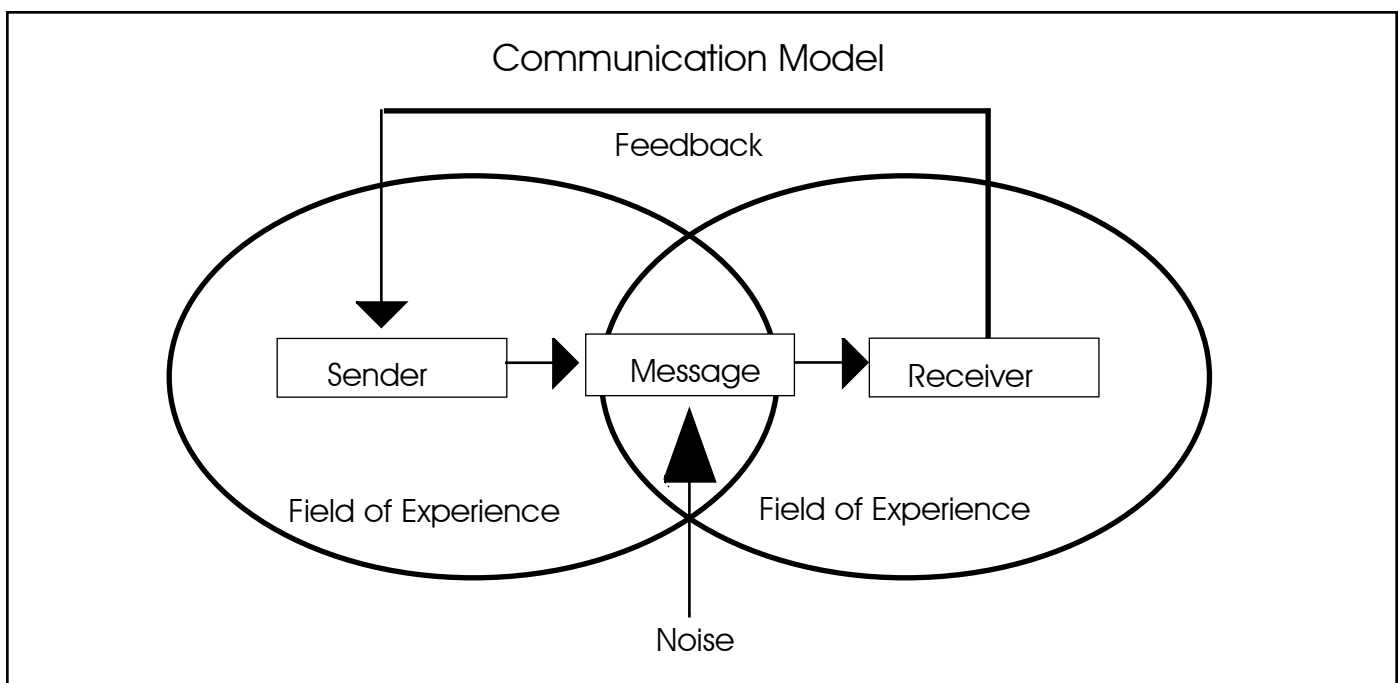


Figure 1-1. Communication Model.

derstand. In other words since most preschoolers can't read, it's silly to provide written directions for them to read. On the other hand, they may be able to interpret photographs as instructions.

The second factor involves outside interference called noise. Students can easily be distracted by shouts from the playground, glare on the television, or the activities of another small group. The "bells and whistles" of some computer software can be distracting. Noise can come in all channels, senses, and emotions. A bad smell, a sore throat, the death of a pet, or a general disinterest can interfere with learning.

The third factor in communication involves fields of experience. What experiences do you bring to the classroom? What about your children? Where do your experiences overlap with those of your students? If your experiences don't overlap with those of your students, it will be difficult to communicate. In addition, your job is to expand the experiences of your students. You do this by knowing your students well and building on their interests and existing skills.

Dale's Cone of Experience is a well-known tool that helps teachers match learning experiences with their student's field of experiences. In other words if your class is studying sea creatures, what kind of experience would be most appropriate? Students can learn effectively and quickly by reading information about a topic, however many students learn better when they see and hear information. Would a trip to Sea World, a DVD on sharks, a book of shark photographs, or a shark lecture be most effective? Consider a virtual visit to the Monterey Bay Aquarium ([www.mbayaq.org](http://www.mbayaq.org)) and view the web cams.

Before you can make a decision, you need to know your students. What skills do your students already have related to the topic? What outcomes do you expect when they get done with the experience? Let's say you're doing a lesson on bike safety. Do the children already know how to ride a bike? Have they had experiences dealing with related safety issues? The more experiences students can draw on, the more abstract your lesson can become. Rather than taking students out on a bike trek, you might do small group role playing or large group discussions (see Figure 1-2).

Many methods can be used to teach particular concepts. You'll find numerous courses and books that deal with specific methods of teaching within various content areas. Methods are the presentation of ideas and concepts in a way that will promote new student learning. Common methods of large group instruction include lecture, discussion, and demonstration. Other methods such as simulation, gaming, discussion, and cooperative learning are often used with small groups of students. Drill and practice, tutorials, discovery, and problem solving are common individualized teaching methods.

**Treehouse Tip**

The less experience your learners have with the topic, the more concrete the lesson must be to meet their needs.

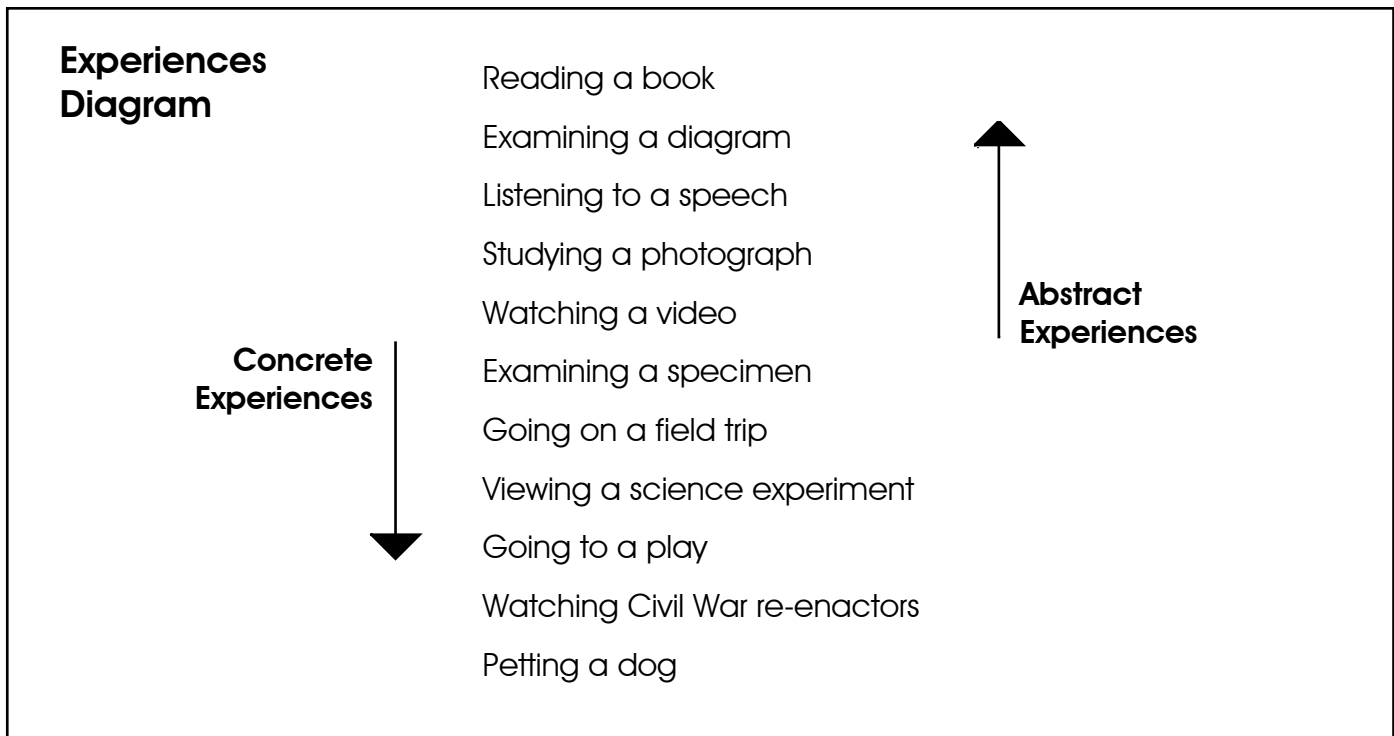


Figure 1-2. Experiences Diagram.



#### Treehouse Tip

Lessons should be:  
 relevant  
 meaningful  
 purposeful  
 respectful

### Designing Lesson Plans

Learning can be easy, hard, fun, or boring. Why? What makes a classroom an exciting place to learn? Let's consider what makes learning difficult and what makes learning easy. According to Goodman (1986), "bottom-up" teaching makes learning hard. In other words, students are presented with unrelated pieces and parts of information through an artificial sequence of skill activities. Because the exercises are irrelevant and nonmeaningful, students lose interest in learning. How can we make learning exciting for children? Consider relevance. Make the learning environment meaningful. Give students a purpose for the projects they do and respect their interests and needs. Students excel through exploration and empowerment.

Let's design active, authentic environments that are exciting, stimulating places to learn! To do this, your lessons must be much more than lecture notes, textbook page numbers, term paper guidelines, and tests. We'll use a lesson planning model that includes the elements found in Figure 1-3.

Table 1-1 lists websites that contain lesson plans to explore.

### Identifying the Learners

Before creating your lessons, you need to carefully consider your audience. Who are your learners? What age and grade level are your students? How many students will be in the class? If you divide your class into small groups, what's the best size for the age and activity? What special activities, considerations,



# Lesson Plan Format

**Lesson Topic/Title****Learners**

Age and Grade Level  
General Characteristics, Individual Differences  
and Multicultural Awareness and Diversity Issues  
Content Area Entry Skills & Implications  
Information and Technology Entry Skills & Implications

**Expected Outcomes and Purpose**

Academic Standard or Goal  
Concepts and Generalizations  
Objectives

**Lesson Technologies, Resources, and Materials**

Teacher Technologies and Resources (i.e., books, websites, CDs, videos)  
Student Technologies and Resources  
Materials and Supplies (i.e., markers, paper, pine cones)

**Learning Environment**

Lesson Length  
Lesson Setting  
Technology Setup  
Classroom Management Considerations

**Teaching/Learning Strategies**

Springboard  
Information Exploration  
Active Involvement  
Closure/Transition

**Connection to Outcomes**

Student Work Evaluation  
Teacher Records

**Extensions**

Learning Centers, Technology-Rich Projects, Information Dissemination

Figure 1-3. Lesson Plan Format.

### Links to Lesson Planning Sites



Teacher Tap: Lessons Links	<a href="http://eduscapes.com/tap/topic2.htm">http://eduscapes.com/tap/topic2.htm</a>
Discovery School	<a href="http://school.discovery.com/lessonplans/">http://school.discovery.com/lessonplans/</a>
The Gateway	<a href="http://thegateway.org/">http://thegateway.org/</a>
Learn NC from North Carolina	<a href="http://learnnc.org/learnnc/lessonp.nsf/homepage">http://learnnc.org/learnnc/lessonp.nsf/homepage</a>
Library of Congress: Learn	<a href="http://memory.loc.gov/learn/">http://memory.loc.gov/learn/</a>
Marcopolo	<a href="http://www.marcopolo-education.org/">http://www.marcopolo-education.org/</a>
National Geographic Lessons	<a href="http://nationalgeographic.com/education/lesson_plans">http://nationalgeographic.com/education/lesson_plans</a>
New York Times Lesson Plans	<a href="http://nytimes.com/learning/teachers/lessons/">http://nytimes.com/learning/teachers/lessons/</a>
PBS Teacher Source	<a href="http://www.pbs.org/teachersource/">http://www.pbs.org/teachersource/</a>
Sequenced Lesson Plans	<a href="http://www.glc.k12.ga.us/seqlps/">http://www.glc.k12.ga.us/seqlps/</a>
Teacher First Content Matrix	<a href="http://www.teachersfirst.com/matrix.htm">http://www.teachersfirst.com/matrix.htm</a>
TeacherVision	<a href="http://teachervision.fen.com/tv/curriculum/lessonplans/">http://teachervision.fen.com/tv/curriculum/lessonplans/</a>
Yahoo's List of Lesson Plan Sites	<a href="http://dir.yahoo.com/Education/k_12/teaching/">http://dir.yahoo.com/Education/k_12/teaching/</a>

Table 1-1. Lesson Planning Sites.

or steps will you take based on the characteristics of your students? For example, if they're at an age where they lack motivation, how will you interest them in your lessons? You can't talk about integrating technology until you know who and what needs to be taught.



#### Treehouse Tip

##### Identifying Learners

- The Class
- Age
- Grade Level
- General Characteristics
- Individual Differences
- Multicultural Issues
- Diversity Issues
- Entry Skills

**The Class.** Before you can design lessons, you need to know your class as a whole as well as the individuals that make up your class. You might have heard teachers say things like "I've got a wild bunch this year" or "This is my best class in years." Each class is unique. It's the interactions and relationships between class members that builds this class atmosphere. Sometimes the addition or removal of one child can make a huge difference. You'll also find that the size of the class matters. You'll be surprised at the difference between 18 and 24 students.

**Age and Grade Level.** What grade level are you teaching? What's the chronological age of your students? What's their developmental age? Each of these elements will impact your planning. The first two are easy. You're teaching third grade and your students are generally between seven and ten years old. Most will probably be seven turning eight. What does this information tell you? There's a big difference between a freshman and a senior. When you hear a teacher say to a student "act your age", the teacher is probably hoping that the learner is able to act like what they expect of a 14 year old rather than a 7 year old.

**General Characteristics, Individual Differences and Multicultural Awareness.** Start with an exploration of the general characteristics of your students. These include gender, age,

grade level, interests, health, motivation, achievement level, abilities, aptitude, social, economic, and cultural factors, foreign language ability, reading level, problem solving ability, vocabulary, attention span, and previous experience. Each variable is important because it will have an impact on the effectiveness of the instructional materials you develop.

Let's say you want all the students in your room to read a novel. Nice idea, but will all the students possess the skills to read the book you have in mind? You might provide a reading list, assign particular books to meet the reading level needs of individual students, distribute books on MP3 audio players, or read a book aloud that the entire class can enjoy. What's your objective? What's the importance of the book? Before you can create an activity, you need to consider your students and the instructional need.

When you design a lesson, consider every child, every time. Until you know your children well, this can be difficult. When you read a story that involves death, divorce, jealousy, or frustration, you may not be able to predict how some children will react. It's hard to know what might "set a child off", but the more you know about your children the better you'll be able to establish a nurturing, supportive classroom environment.

In addition to becoming aware of the emotional side of each child, you also need to know their interests, talents, abilities, and challenges. You can often draw a child into an activity by sparking their personal interests. This may involve letting students select from multiple story starters, providing varied examples in an algebra class, or allowing students to select a project from a list of topics. By following the interests of children, you can maintain their attention throughout the lesson rather than just using it as a springboard into the activity.

Talents are another way to meet individual needs. Students often choose to be involved with activities where they have a talent or special ability. This is often reflected in their likes and dislikes. If they "like" drawing, they probably see themselves as artists. Let students select activities that will help these talents evolve. At the same time, provide opportunities for students to work on areas where they need to improve. Rather than requiring them to participate, let them choose activities where they can be helped by children who feel confident in the area. Teach students to become effective peer tutors. Encouraging students to select activities where they can apply their strengths and address their challenges creates an effective environment for cooperative learning.

Students may not be aware of their strengths and weaknesses. They may confuse interests and disinterests with abilities and challenges. Students may find that as they improve in



an area, they may choose to participate more often, gain more practice, and ultimately enjoy the experience!

Remember that these individual differences go beyond traditional interests and abilities and into issues of emotional maturity, learning styles, and motivation. Addressing these areas is much more difficult and time consuming.



#### Treehouse Tip

##### **Entry Skills**

Before developing a lesson, you need to know the content and technology skills that your students currently possess.



**Entry Skills.** Students will come to your class with a particular set of characteristics including their age, talents, interests, and emotional maturity. They will also come with a set of knowledge, skills, attitudes, and values that have already been learned at home, school, work, or play. Knowing the entry skills of your students is critical for successful lesson planning. Entry skills include knowledge, study skills, problem solving skills, biases, and misconceptions. Some entry skills are easy to check such as, are they readers or nonreaders? Can they use the keyboard effectively? Can they add fractions or not? Higher level thinking skills such as problem solving and critical thinking are more difficult to measure.

Let's say you've been teaching fifth grade for years, but you've switched levels and it's your first day as a first grade teacher. You write your name and interests on the chalkboard to share with your students. You ask students to examine the list and see if they share any of your interests. Looking over a sea of blank faces, you see a little hand go up. "Ms. Walker," he says, "we don't know how to read." This is a classic case of overlooking important entry skills. You'll be surprised how often this kind of thing happens. It could be unfamiliar vocabulary, unknown math formulas, or references to undiscovered places.

You need to know what skills students already possess when they come to your class. Without this knowledge, your lessons will be a disaster! Let's say you want to have your sixth graders share their book reviews with other classes around the world in an online forum. You plan what should be more than enough time for each child to enter their book review. You're only half way through the class and you've run out of time. What happened? You didn't consider their entry skills! You might have done a great job anticipating how much time it would take to teach them to use the online forum environment, but you didn't consider their poor typing skills.

Let's take another situation. You're doing a lesson on community helpers in your second grade class. Each small group will select and explore a career from an electronic database that contains information on over 200 potential careers. The lesson's a disaster. What happened? First, students didn't have the sixth grade reading level required to read the content of the database. Second, with over 200 choices, they had a hard time finding the few careers they knew. For example, the word "teacher" was

listed under "education" and "fire fighter" was found with "community service employees". Again, the problems related to not matching the electronic database with the entry skills and ability levels of your children.

**Implications.** Once you've identified critical characteristics and entry skills, you need to consider the implications of this information. How will you apply what you know about these children to the teaching/learning environment? Some applications are logic. If students can't read, you can't expect them to follow written directions. If they can't add one column of numbers, they certainly aren't ready for two digit addition. If your class as a whole has a shorter than average attention span, you'll need to plan very small chunks of instruction. On the other hand, how do you deal with the knowledge that a child's parent has recently died? You can't spend the year worried that you'll say the words cancer, illness, accident, death or dying. Instead, you must be sensitive to this child's emotional well-being and be prepared to deal with questions as they arise. Examine the following characteristics and consider implications:

College-prep students in honors English  
Junior level remedial consumer math  
First graders learning about careers

Explore the student characteristics and matching implications are listed below:

*Lesson Topic:* Fractions

*Characteristics:* Ages range from six to nine. They are relatively new to math, but are "good at" shapes. They have very limited reading skills. They enjoy using the computer.

*Implications:* The text for written assignments must be very concise and easy to read. Problems should have a consistent format and require little reading. Lots of "bells and whistles" in a computer program may be distracting for students. Keep it simple.

*Lesson Topic:* Dangers of Smoking

*Characteristics:* Seventh grade health education class. Twenty-five students; half boys and half girls; can sit and listen for 10-15 minutes, restlessness sets in after that. Class responds thoughtfully in discussions, especially if relevant to their immediate lives, most students are eager to contribute ideas, some have tried cigarettes, a few may be smokers.

*Implications:* The age of the group indicates the need to present realistic examples and use concrete vocabulary. Because of the size of the class, the visuals will need to be projected





## Building the Treehouse Try It!

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**Practice identifying the characteristics of learners including the following elements:**

Age and Grade Level  
General Characteristics, Individual Differences & Multicultural Awareness  
Entry Skills: Content, Information, and Technology  
Implications

**Working in pairs, select a particular grade level and content area to analyze. Independently create a scenario that describes a particular class of students. Compare your work with your partner. Use the criteria below to evaluate your work:**

Was the grade level and number of students stated?  
Were the general characteristics of the audience discussed?  
Were student entry skills described?  
Were implications of the audience characteristics and entry skills discussed?

**How are your classes similar? How are they different? Would you be able to do the same activities in each classroom? How might they be different? Why?**

**Your pair should meet with another pair who examined an entirely different grade level. How are your students similar and different?**

**Visit a school and observe one classroom at least twice. Identify the characteristics of the learners.**

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## Identifying Your Learners

on a big screen to be seen. Because of their attention span and immediate relevancy of the topic, discussion and role playing may be effective in getting students actively involved in the lesson.

### Identifying the Expected Outcomes & Purpose

Instruction should contain expected outcomes and a specific purpose. Your outcomes are stated as the goals and objectives of your lesson. These outcomes relate to the concepts and generalizations you hope your students will attain as a result of the lesson. The purpose addresses the issue of why it is important that they learn this particular concept or generalization now. The easy answer is "because it's in the standardized test, textbook, or curriculum guide." The more difficult explanation relates to broader issues regarding the purpose of education and what it means to be an educated person. The point is to focus on critical skills that students will need to be successful.

**Academic Standard or Goal.** Standards are everywhere. There are federal, state, and local school guidelines that must be followed in the development of your lessons. It's a good idea to match each lesson with a particular state standard or local school curriculum goal (see Table 1-2).

It's often not possible to address all the requirements of a standard. Use goals as a way to address the specific aspects of a broad standard. Examine the following Grade 10 English Standard:

Analyze the way in which authors have used archetypes (models or patterns) drawn from myth and tradition in literature, film, political speeches, and religious writing.

It's unlikely that you'll be able to address every aspect of this standard in a single lesson. However, you may develop a goal that focuses on a particular aspect of this standard. For instance, you may evaluate the themes found in *The Crucible* by Arthur Miller. Your goal would place emphasis on evaluating themes found in historical novels.

The goal explains what you want your students to be able to do or talk about when they complete your lesson. It should be observable and measurable. Will the students apply, demonstrate, create, or be able to do something?

Your goal may be made up of a series of related objectives that will address a standard within a subject area or across several subject areas.

Instructional goals describe the outcomes of instruction in terms of student performance. They do not describe the process



#### Internet Connection

**Standards-based Lessons**  
**Marcopolo**  
[marcopolo-education.org](http://marcopolo-education.org)

### Associations and Standards Links

Teacher Tap: Education Standards	<a href="http://eduscapes.com/tap/topic28.htm">http://eduscapes.com/tap/topic28.htm</a>
Teacher Tap: Education Organizations	<a href="http://eduscapes.com/tap/topic41.htm">http://eduscapes.com/tap/topic41.htm</a>
ASCD	<a href="http://www.ascd.org/">http://www.ascd.org/</a>
International Reading Association	<a href="http://www.reading.org/">http://www.reading.org/</a>
International Society for Tech in Education	<a href="http://cnets.iste.org/">http://cnets.iste.org/</a>
MCREL	<a href="http://www.mcrel.org/standards-benchmarks/">http://www.mcrel.org/standards-benchmarks/</a>
National Council on Economics Education	<a href="http://www.ncee.net/">http://www.ncee.net/</a>
National Council Teachers English	<a href="http://www.ncte.org/">http://www.ncte.org/</a>
National Council Teachers Math	<a href="http://www.nctm.org/">http://www.nctm.org/</a>
National Council Social Studies	<a href="http://www.ncss.org/">http://www.ncss.org/</a>
National Science Teacher Assoc.	<a href="http://www.nsta.org/">http://www.nsta.org/</a>
State Standards	<a href="http://www.statestandards.com/">http://www.statestandards.com/</a>
US Department of Education	<a href="http://www.ed.gov/">http://www.ed.gov/</a>
Yahoo's Standards & Testing	<a href="http://dir.yahoo.com/Education/Standards_and_Testing/">http://dir.yahoo.com/Education/Standards_and_Testing/</a>



Table 1-2. Associations and Standards Links.



of instruction, teacher performance, or some other means to an end. Some examples and nonexamples of goals are shown below:

#### *Acceptable Goal Statements*

Calculate the area of simple geometric shapes.  
Identify the continents on a globe.

#### *Unacceptable Goal Statements*

Assign a research paper to students.  
Appreciate the contributions of great scientists.  
Teach about decimals.

**Concepts and Generalizations.** Narrow the focus of a lesson to a single concept and set of generalizations. Start with a single concept such as plants or democracy. Do you want students to be able to define it, discuss it, identify it, or show an example of it? Why is this important? We say a student "has" a concept when they are able to identify both examples and nonexamples and can point out specific attributes that distinguish the concept from other ideas or objects.

If your students are studying magnetism, you'd probably want them to be able to predict whether or not any given object would be attracted to a magnet. To do this, students would need to know the characteristics of objects that are magnetic. A steel paperclip would be an example of something that is attracted to a magnet and a plastic paperclip would be a nonexample. A generalization would be that steel objects are attracted to magnets and plastic objects are not attracted to magnets.

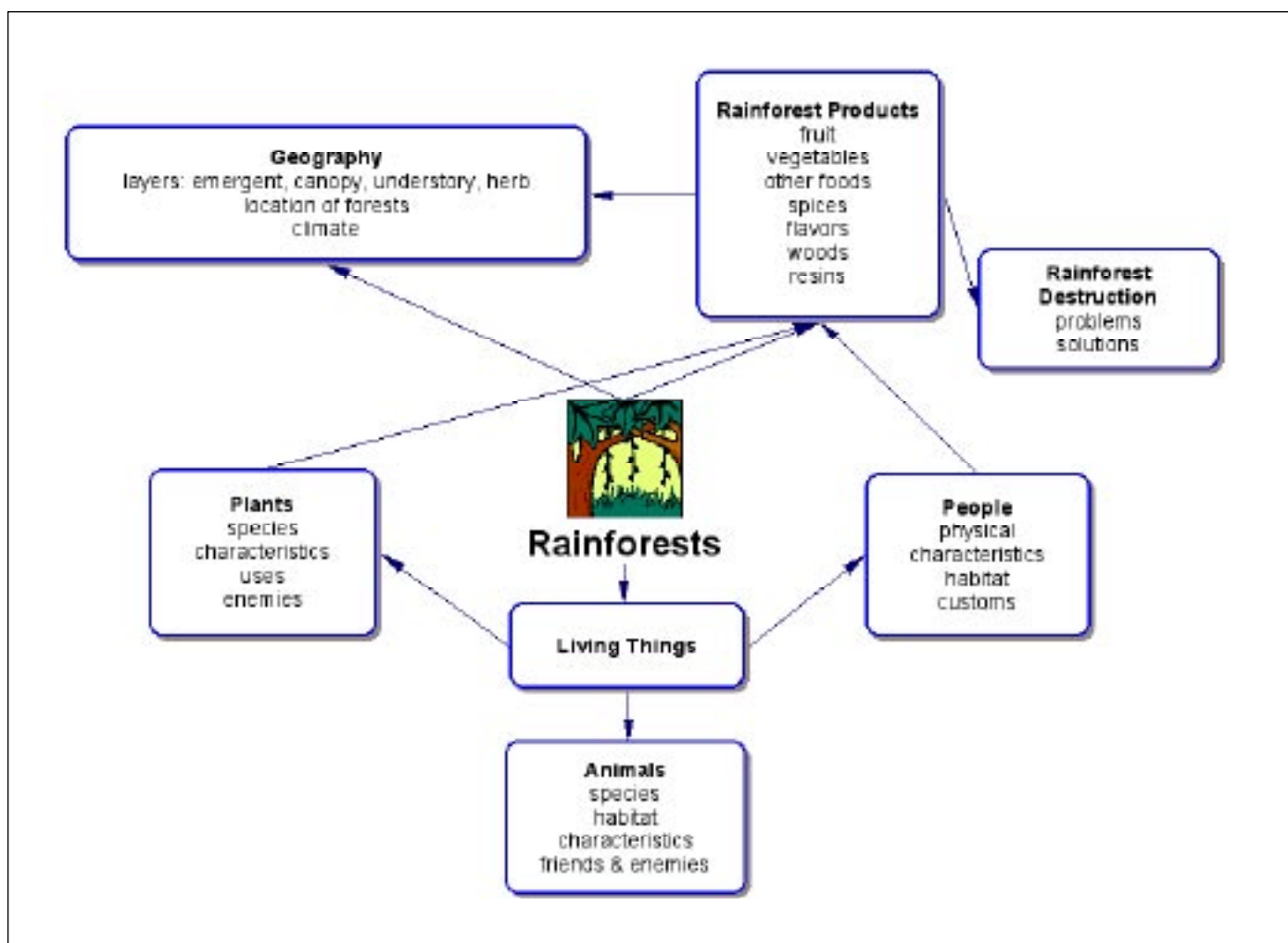


Figure 1-4. Rainforest web.

Sometimes it's difficult to visualize the critical attributes of a concept or identify the skills learners need to reach a goal. Diagrams are often helpful in visualizing related elements. A web, or concept map is the most common type of diagram (see Figure 1-4). Write the concept in the middle of the page. Around the concept you might place verbal information, characteristics, examples, nonexamples, and definitions. Include anything you can think of that relates to the concept. Use circles and lines to connect ideas. You might even consider using colored markers to highlight particular ideas. Rather than doing this alone, get your class involved. This will also be helpful in finding interests, identifying entry skills, and anticipating questions.

A software package called **Inspiration** is a wonderful tool for creating visual maps. This tool helps you organize information in many different ways. You can even turn the visual diagram into an outline.

There are many ways to organize your ideas. Hierarchies are good for analyzing goals that contain skills that build on one another. For example before you can alphabetize by the first two



#### Internet Connection

##### **Inspiration**

[www.inspiration.com](http://www.inspiration.com)

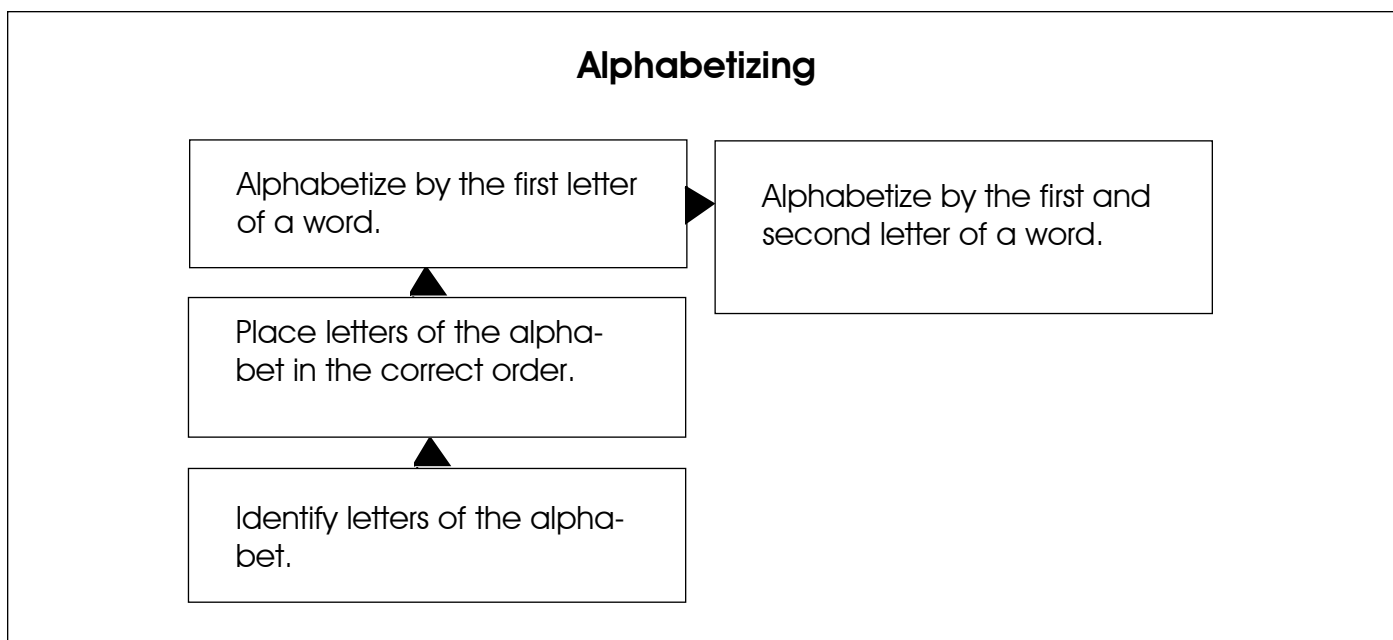


Figure 1-5. Alphabetizing.

letters in a word, you need to be able to alphabetize by the first letter. You can't alphabetize at all until you know the alphabet in order. You can use boxes and arrows to show relationships.

Procedures are another way to organize ideas. Use this approach to identify steps in a process. Start with the first step in the process and list each item in the sequence that is necessary to reach the goal.

Many times you'll combine these approaches. Figure 1-5 shows a simple diagram of alphabetizing. Notice that there's both a hierarchy and a procedure. The hierarchy shows that there are two skills students need to learn before they can alphabetize by the first letter in a word. The procedure involves alphabetizing by the first letter then the second letter.

Let's use the life cycle of the butterfly as another example. You might start with concept mapping using a web. A hierarchy might be used to organize information about body parts. For example, before you can understand how the wings work, you must define and identify the parts and composition of the wing. You might visualize the life cycles in a procedural way.

Examine your diagram and begin thinking about outcomes. What exactly do students need to know about the concept? What do students need to be able to do? Focus in on the most important elements, concentrating on outcomes. Think about content and skills. Many beginning teachers want to skip this step and go straight to designing cute activities. They want to "teach" penguins by having students do worksheets, create penguins out of construction paper, or read a book. Instead, ask yourself, what is it that students need to know about penguins? You can't choose your materials and projects until you've



#### Treehouse Tip

##### **Visualizing content**

Webs  
Hierarchies  
Procedures



answered this question. Do you want students to identify the different types of penguin species by name? Is it important that they can distinguish the four types of penguin species by weight? Do you want students to be able to describe the physical characteristics of each penguin type? Why?

**Objectives.** Before you can design effective activities, you need to know what student outcomes you expect. What should your students be able to do or talk about when they complete the lesson? Start by trying to visualize your overall goal. Is your goal related to a particular concept? Are there generalizations that you wish each student to grasp? Can you state these ideas very specifically as objectives?

Performance objectives are clear, precise statements of what learners should be able to do when they complete your lesson. Objectives should be measurable and observable. In other words, there must be a way to assess whether a student has met a particular objective. As such, wishy-washy objectives containing words like appreciate, understand, and know about will not be useful. The purpose of objectives is to help the teacher focus on exactly what outcome he or she expects from the student at the conclusion of instruction.

The ABCD format is a popular way for writing objectives. ABCD stands for Audience, Behavior, Conditions, and Degree.

<b>A</b>	<b>Audience</b>	Who	The student will ...
<b>B</b>	<b>Behavior</b>	Will what?	identify, compare
<b>C</b>	<b>Condition</b>	With what?	given a calculator, given a baseball, given a map
<b>D</b>	<b>Degree</b>	How well?	3 out of 4 times

**Audience.** The **audience** is the target of the instruction. It can be stated as the student, the freshman, or the ten year old. Some people list the audience at the beginning of the lesson and leave it out of the objective. The audience statement should focus on the student, not the teacher. Do not say, "The teacher will lecture". That's part of instruction, not the outcome of instruction. Examples include:

The learner will ...  
The senior college math class will ...  
The seventh graders will ...

**Behavior.** A carefully stated **behavior** is essential to a well-written objective. It should very precisely describe what you want your students to do. Choose your verb carefully. Will the student be writing, identifying, calculating, arranging, or kicking?



#### Internet Connections

##### Objectives

##### Understanding Objectives

[edweb.sdsu.edu/courses/EDTEC540/objectives/ObjectivesHome.html](http://edweb.sdsu.edu/courses/EDTEC540/objectives/ObjectivesHome.html)

##### Writing Clear Objectives

[tlt.its.psu.edu/suggestions/research/Write\\_Objectives.shtml](http://tlt.its.psu.edu/suggestions/research/Write_Objectives.shtml)

##### Writing Objectives

[edtech.tennessee.edu/~bobannon/writing\\_objectives.html](http://edtech.tennessee.edu/~bobannon/writing_objectives.html)



## Building the Treehouse Try It!

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Select one of the following topics, select a grade level, and create a web of information. You might also use a hierarchy or procedure to examine some aspect of the web.

Butterflies  
Gold Rush  
Owning Your Own Business  
Poetry  
Friendship  
Measurement  
Violence  
Basketball  
Endangered Animals

Write three generalizations that might be taught in a lesson related to this topic.

---

## Analyzing Content

Avoid vague words such as know and understand. How can you test whether a student "knows" something? Be more specific, do you want students to define, categorize, or demonstrate what they "know". Consider your students and your expectations. Select high level objectives that will challenge you and your students. For example, rather than words such as state, list, or copy, strive for words such as apply, formulate, and distinguish. These words force students to go beyond spitting back facts and require students to think, reflect, synthesize, and elaborate. Figure 1-6 contains a list of popular "words" to get you started with objectives.

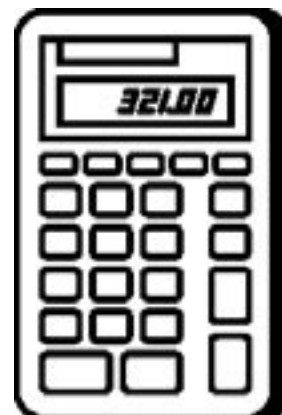
**Conditions.** You must describe the **conditions** which will prevail while the student carries out the performance. Think about this as the situation where students should be able to perform the task. For example, in driver's education, you'd expect students to be able to perform certain maneuvers in particular weather conditions such as on ice or snow. You'd want a basketball player to be able to make a basket while they are being defended.

Conditions usually relate to objects. What will you give a student or deny access to during the performance? During the skit will students be able to use the script or not? Paper and pencil are obvious and don't usually need to be stated. However if specific props or tools are needed, they should be included in the objective.

Let's say you're giving a math test, would the students be able to use a calculator, compass, protractor, or other tools? These should be listed as conditions of the objectives. If your students are studying geography, will they get to use a world map as a reference or not? Will students be identifying elements of a photograph, graphic, or other type of picture? If you're teaching a motor skill such as golf, I would assume that clubs, balls, and a hole would be part of the conditions.

It's not necessary to include every little detail, but you need to be clear on what conditions you expect. In addition, students need to know these expectations. For example, if you're giving a math test, students will want to know if they can use their calculators! People might also be part of the condition. Working individually, in pairs, or in small groups could be a condition if it is important to the performance.

Suppose you want students to be able to identify the three rock types including igneous, sedimentary, and metamorphic. Under what conditions would they be able to make the identification? Do you want them to be able to identify the names of rocks that belong in each category, point to pictures of rocks of each type, or choose the actual rock that fits a particular category? If you want to prepare students for the "real-world"



#### Treehouse Tip

##### ***Elements of Objectives***

Audience  
Behavior  
Conditions  
Degree

### Action Words for Objectives

add	demonstrate	justify	remove
alphabetize	derive	label	reorganize
analyze	describe	list	restate
animate	design	locate	retell-in-
apply	designate	make	your-own-
appraise	determine	manipulate	words
arrange	develop	match	revise
assemble	diagnose	measure	rewrite
brainstorm	diagram	memorize	select
browse	differentiate	modify	share
build	discuss	multiply	show
carve	dissect	name	sketch
categorize	distinguish	operate	solve
choose	document	order	sort
classify	draw	organize	speak
cluster	estimate	outline	specify
color	evaluate	paint	spell
compare	examine	paraphrase	square
compile	explain	plan	state
complete	explore	plot	subtract
compose	extrapolate	position	suggest
compute	find out	predict	summarize
conclude	fit	prepare	support
conduct	formulate	present	swing
connect	generate	pretend	synthesize
construct	give-an-example	prioritize	tabulate
contrast	graph	produce	tell
convert	hit	pronounce	throw
correct	hold	put-in-order	time
create	identify	rank	trace
cut	illustrate	rate	translate
debate	indicate	read	type
decide	infer	rearrange	use
deduce	install	recall	verbalize
deduct	interpret	reconstruct	verify
defend	invent	reduce	weigh
define	judge	relate	write

Figure 1-6. Action words for objectives.

where they might pick up rocks and need to identify them, it makes sense to write an objective that will match your desired outcome. Your condition might be "given three rocks". If you're only interested in naming rocks in particular categories you might say "given the names of rocks." Below are three different conditions for similar objectives:

Given a set of rocks, the student will categorize the rocks as igneous, sedimentary, or metamorphic.

Given pictures of rocks, the student will identify each rock as igneous, sedimentary, or metamorphic.

Given a list of rock names, the student will match each name to its category (i.e., igneous, sedimentary, or metamorphic).

Many teachers make the mistake of restating their instructions as conditions. Conditions should relate to the outcome not the instruction. Do not say "after watching a video" or "after listening to a lecture." The outcome is not to listen to the teacher, it's to use a calculator to perform math equations.

**Degree.** The last element of an objective is **degree**. What is required for satisfactory performance? How do you plan to judge the performance of the student? What standard or criteria will you use? Will you use a checklist? Are there elements that students must include in their answers? You may want to consider accuracy. If you expect mastery in every case, you won't need to state a degree. If it's okay to list 8 of 10 steps in the process rather than all ten, you'll need to state that expectation.

Degree can also relate to time. For example, students may have to solve the problem within 3 minutes. You may also include specific criteria for the performance. For example, the book report must include discussion of the characters, plot, and setting.

Some objectives sound like test questions because they include all the information that is needed to write a test question. Notice that although the objectives below both deal with fractions, they ask students to demonstrate different skills. In the first objective students simply pick the shapes with particular characteristics. The second objective asks students to write a fraction from the information provided.

Given circles, rectangles, or squares, identify the shapes that are divided into three equal parts.

Given simple geometric shapes (e.g., rectangles, squares, or circles) divided into equal parts ( $<13$ ths) with 0 to 12 sections shaded, each learner will write the fractions which correctly represent the shaded portion of the figures.



#### Treehouse Tip

##### **Types of Degrees**

Time

Accuracy



Objectives can be used to generate questions or directions for demonstrations, but the objective itself is not a test item. It should be a statement of what the learner should be able to do after instruction. In other words, if the student were out in the "real world" would they meet your expectations for this objective? Let's say you're teaching students to prepare a table for a meal. You would want the student to be able to perform this skill regardless of the setting. It might be at school, home, or work. Being able to answer multiple choice questions about the location of the utensils is helpful, but in the end, the objective below is more practical.



Given a standard place setting including a knife, a fork, a spoon, a plate, a napkin, and a glass, the student will arrange the place setting.

The audience is the student. Arrange is the key behavior. The conditions include the elements of the place setting. This objective does not have a degree, so it is assumed that the setting must be correct to be met.

Examine the objective below. What do you think?

After watching a 20 minute videotape, the student will know about it when asked.

The objective contains the ABCD, but three of the four are not examples of good elements. The audience is fine. What about the behavior? "Know about it" is a poor word selection. What does "know" mean? How are you going to know if they know? What's "it"? It's probably the concept, but it's useless without being stated explicitly. The conditions are also inaccurate. Conditions should relate to the performance, not the instruction. Finally, "when asked" is not a degree. A degree should include the level of accuracy. The objective below is much better.

When shown a main topic and three other topics, the student will identify the topic that is more narrow, more broad, and related 100% of the time.

Writing objectives is at the center of a debate about lesson planning and student performance. Some people find traditional objectives too confining. Educators have pointed out that their emphasis on behavior makes it difficult to incorporate learning that focuses on attitudes and higher order thinking skills. On the other hand, objectives are important guides in planning your lesson. If you don't know exactly what you ex-

pect students to be able to do, how will you know if they can do it?

With an ongoing emphasis on standards and accountability, objectives can be used to demonstrate a direct connection between the standard and specific classroom instruction. Your objectives may connect to standards across subject areas. For example, you might identify a social studies standard related to causes of the Civil War, an information standard related to interpreting primary source documents, and a technology standard focusing on the use of electronic databases. Your objectives will then reflect the particular emphasis of the current lesson.

Another debate relates to whether objectives should be "generic" or specific to the activities of the lesson. Examine the objectives below.

The first objective is generic and is not stated within the context of a particular classroom activity. It is related to the performance itself.

The second objective is specific to the classroom setting. Students are working in pairs to create a product with specific resources to particular criteria. This objective relates to a particular lesson setting. Both objectives are acceptable. The first is a more traditional approach that focuses on the outcome itself rather than activities that can also be used to demonstrate the outcome.

The third item is not acceptable because it focuses on the teacher rather than the student performance. Remember that the purpose of objectives is to focus on outcomes for student learning, not what the educator will be teaching.

#### *Acceptable Objectives*

Given sample quilt blocks, students will identify Colonial period quilt patterns by name.

Working in pairs, students will create a Colonial quilt shape in KidPix. The quilt should be a Colonial style and be labeled with the name of the pattern.

#### *Unacceptable Objective*

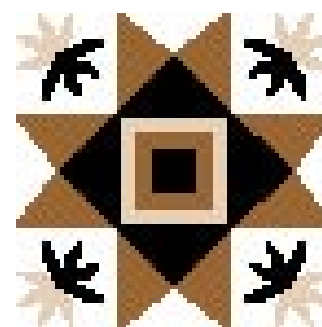
Given books on quilts, the teacher will show students the different kinds of quilt patterns used in the Colonial period.

Use the following questions to help you evaluate your goals and objectives:

Is this outcome important? Why?

Is it possible for my students to reach this objective?

Through what means?



**Treehouse Tip**

Don't get too bogged down in the wording of objectives. Remember, the purpose is to help you teach and students learn!

- Is it clearly and precisely stated?
- Is it a reasonable size?
- Is it possible and relatively easy to access?
- Is it worth accessing?

For beginning teachers, it's important to state each expected outcome and purpose on your lesson plan. Start with a goal statement. Then in a short paragraph, write about the purpose of the lesson. Answer the following questions. Why is it important for students to learn these concepts? How does this new information relate to prior learning? How will students be able to use these skills in the future?

Figure 1-7 shows the purpose, goals, and objectives for a unit on rainforests. The unit contains twelve lessons to reach its goal. Many of the same resources will be used throughout the unit.

**Lesson Resources and Materials**

Identify a set of lesson resources that relate to your topic/theme and student outcomes. Remember individual differences. Some children learn better through the audio channel while others learn better through still and motion visuals. In addition, consider the information formats that will be the most effective. Will large group lectures, small group activities, or individualized instruction be best for your children?

Resources should cross technologies. Go beyond fiction and nonfiction books. Include videos, films, maps, kits, CD-ROM, DVDs, software, online resources, and realia (real things). Consider tools and resources that students will need to create projects including hypermedia/presentation tools, digital audio recorders, personal hand-held devices, poster materials, and other resources. These technologies will be discussed in later chapters.

When collecting resources consider both teacher and student materials. **Teacher resources** include the teacher resource manual, trade books, sample lessons, background information, online lesson plan extensions, and other information that might be helpful in planning and teaching. **Student resources** are those materials that students will be using in the lesson including textbooks, handouts, books, videos, computer software, web sites, and anything else students will be using during the lesson.

In most lessons, you will use a combination of print and nonprint materials. You may use materials from your textbook, resources from the library/media center, and materials you produce yourself. Some lessons may require few materials while others may require many. Some of these materials will be used by the teachers for planning while others will be used during the lesson. Describe the materials you plan to use in your lesson. Your description should include the reason for selection as well as how it might be used.

**Treehouse Tip**

Be a collector. Bring all the resources together, then ask yourself: what are the best resources for teaching and learning about the topic.

Supplies are another important thing to consider. Construction paper, markers, pipe cleaners, and glue are all materials that might be needed in a lesson. Also consider items such as batteries, ink jet cartridges, and digital storage. Paper and pencil might be all the supplies needed for one lesson, but much more planning might be needed for another class activity. Supplies may not seem important, but they can make or break a lesson.

Let's say you're doing a lesson on magnetism and your lesson doesn't list any materials or supplies. You're in big trouble. How are you going to teach magnetism without magnets? If you're planning small group activities, you probably need a magnet for at least one in four students plus objects that are and are not attracted to the magnet. The same goes for all the resources needed for the lesson. If you plan to use a video, you'll need to reserve the DVD player ahead of time! If you want to use the Document Reader to zoom in on the items in a science experiment and demonstrate the metal filings and magnetic forces close-up, you'll need the Reader and a data projector.

If you list all your equipment, materials, and supplies at the beginning of your lesson, it makes teaching much easier. You don't have to worry about forgetting the book you planned to read aloud or the chemicals you need for your science experiment.

Figure 1-8 shows a list of materials that will be used in a unit on rainforests. The unit contains twelve lessons, so not all materials will be needed at once. It's helpful to describe the materials and their uses as a reminder.

### Learning Environment

Once you've identified your learners, outcomes, and resources, you're ready to describe the learning environment. If someone else were conducting your lesson, what would they need to know to prepare the classroom? How much time will the lesson require? How will the classroom be arranged? Where will the students be working? How will technology resources be managed?

**Lesson Length.** How long will the lesson take? Some teachers like to list the length of time for each component of the lesson while others provide a "ball park" figure for the entire activity. As you plan, remember that most students can only concentrate for about ten minutes at a time.

The length of your lesson should be dictated by the desired outcome. How long will it take for students to grasp the concept or learn the skill? Have you built in enough time to handle potential problems or slow learners? Unfortunately, lesson length is most often determined by the length of a "period" or the time available between music and art rather than the learning need.



#### Treehouse Tip

As a beginner, guess how long a lesson might take, then double the time as a "safety net."



## Building the Treehouse Try It!

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**You're in charge of developing a series of lessons related to one of the topics below. Choose a topic.**

Butterflies  
Gold Rush  
Owning Your Own Business  
Poetry  
Friendship  
Measurement  
Violence  
Basketball  
Endangered Animals

**Your mission is to develop a statement of purpose, a goal, and a series of objectives that might be taught at the grade level of your choice. Use the criteria below to evaluate your assignment.**

Was the purpose of the learning clear?  
Was at least one goal stated?  
Were at least five objectives stated?  
Was each objective stated in ABCD format?  
Was the audience of each objective clear?  
Were the behaviors measurable and observable?  
Were the conditions stated as needed?  
Was the degree appropriate for each objective?

---

## Identifying Purpose and Outcomes



## Rainforests Unit Overview

### Purpose

The rainforest is an important part of our world that is in the process of being destroyed. It's important that students can describe the unique nature of the rainforest including the geography, people, plants, and animals. Students will explore threats to the rainforest and develop recommendations for dealing with this problem. This unit is important because students need to understand the importance that their actions have on the world around them.



### Grade 6 Standards

- Locate and map the climate regions.

- Identify biomes and their physical features.

- Analyze the distribution of renewable and nonrenewable resources and how each is threatened.

- Analyze and give examples of the consequences of human impact on the physical environment and evaluate ways in which technology influences human capacity to modify the physical environment.

### Goal

- To create recommendations regarding the rainforest environment.

### Objectives

- Given a diagram of a rainforest, the student will label and describe the four layers.

- The student will describe characteristics of the rainforest.

- The student will compare and contrast the characteristics of a tropical rainforest and a forest in southern Indiana.

- Given paper and markers, the student will draw the process of transpiration.

- The student will describe the process of transpiration and why it happens.

- Given a rain chart, the student will estimate the amount of rain that falls in the rainforest each year and the approximate number of rain days.

- The student will describe an animal from the rainforest including information about the animal's species, habitat, physical characteristics, and enemies.

- The student will describe a culture of people who live in the rainforest including information about the people's physical characteristics, habitat, and customs.

- Given a world map, the student will identify the locations of primary rainforests including the correct continent and country.

- Given objects found in a home, the student will identify those products that come from rainforest resources.

- The student will describe reasons for and against saving the rainforest.

- The student will investigate rainforest problems and possible solutions.

- The student will debate issues related to the destruction of the rainforest.

- Given word processing software, the student will construct a persuasive business letter including heading, inside address, salutation, body, closing, and signature.

Figure 1-7. Sample purpose, goals, and objectives.

### Rainforest Unit Resources and Materials

#### **Books**

Albert, T. (2003). **The Remarkable Rainforest**. Trickle Creek Books.

Contains lots of great information and activities.

Baker, L. (1991). **Life in the Rainforests**. New York: Scholastic.

Discusses life in the rainforest. Contains geography, animal, plant and climate information.

This book will be used throughout the unit for information.

Cherry, L. (1990). **The Great Kapok Tree**. Voyager Picture Book.

Explore the rainforest through this great picture book about the Great Kapok Tree.

Cherry, L. (1998) **The Shaman's Apprentice**. Gulliver Books

Learn the plants and animals of the rainforest in this book about the Shaman's apprentice.

Cobb, V. (1992). **This Place is Wet**. New York: Walker and Company.

Contains information about the climate in rainforests specifically moisture. Explains why rainforests are damp and provides information about rainfall and moisture measurement.

Knapp, B. (1992). **What Do We Know About Rainforests?** New York: Peter Bedrick Books.

Provides information about the four layers of the forest floor. Quality pictures help students visualize the rainforest. Will be used by students to design their rainforest pop-ups.

Pratt, K. (1992). **A Walk in the Rainforest**. Dawn Pubns.

Provides a nice overview of the rainforest in a simple picture book format.

Ring, S. (2003). **Rainforest Adventure**. Innovative Kids.

Readers go on a fictional journey learning about the rainforest while solving problems.

Rodgers, M. & Mutel, C. (1991). **Our Endangered Planet: Tropical Rain Forests**. Lerner.

Describes why the rainforests became endangered and what is needed to slow the destructive process. Includes information on products from the rainforest and how forests are being destroyed to maintain supply of products.

#### **Educational Software**

**Amazon Trail** by Learning Company (CD-ROM)

Simulation used to explore the Amazon River and beyond. This software will be used as part of an optional, enrichment activity at the conclusion of the unit.

**Digital Field Trip to the Rainforest** by Digital Frog International (CD ROM)

This software provides introductory information, concept and skill development, practice, and assessment. The program explores botany, rainforest species and their complex interdependence, and how this vital ecosystem affects the earth and its inhabitants.

**EasyBook Deluxe Writing Workshops: Rainforest** by Sunburst/Rainforest (CD-ROM)

Writing Workshop combines theme-based activities with EasyBook Deluxe.

**A Field Trip to the Rainforest Deluxe by Sunburst** by Sunburst/Rainforest (CD-ROM)

Students travel to the tropical rainforests of South America, Africa, and Southeast Asia to learn about the plants, animals, climate, people, products, and future of the rainforest.

**Imagination Express CD: Rainforest** by Edmark (CD-ROM)

Students incorporate rainforest backgrounds, sounds, animals, and plants into creative multimedia projects. Text, graphics, and sounds can be added to a series of screens that make up the project.

**Inspiration and Kidspiration** by Inspiration (CD-ROM)

This software tool helps students create visual maps and diagram.

Figure 1-8. Rainforest Unit Resources and Materials.

**Rainforest Designer** by Tom Snyder (CD-ROM)

Students design, print, and build 3-D rainforest habitats.

**Rainforest Researcher** by Tom Snyder (CD-ROM)

With Rainforest Researchers, students become teams of scientists faced with two challenging assignments about rainforest plants.

*Internet Resources***Amazon Interactive**

<http://www.eduweb.com/amazon.html>

**Blue Planet Biomes: Tropical Rainforests**

<http://www.blueplanetbiomes.org/rainforest.htm>

**Children's Tropical Forests**

<http://www.tropical-forests.com/>

**Dr. Blythe's Rainforest Education Website**

<http://www.blueplanetbiomes.org/rainforest.htm>

**How Stuff Works: Rainforest**

<http://www.tropical-forests.com/>

**Journey into Amazonia**

<http://www.pbs.org/journeyintoamazonia/>

**Learning About Rainforests**

[http://www.srl.caltech.edu/personnel/krubal/rainforest/serve\\_home.html](http://www.srl.caltech.edu/personnel/krubal/rainforest/serve_home.html)

**Live from the Rainforest**

<http://passporttoknowledge.com/rainforest/intro.html>

**National Geographic Habitats**

<http://www.nationalgeographic.com/geographyaction/habitats/>

**Be a Habitat Hero** [http://cgi.nationalgeographic.com/cgi-bin/worldpoll\\_pledge.pl](http://cgi.nationalgeographic.com/cgi-bin/worldpoll_pledge.pl)

**Wild World** <http://www.nationalgeographic.com/wildworld/>

**Ontario Science Centre: Rainforests**

<http://www.ontariosciencecentre.ca/scizone/e3/rainforest/default.asp>

**Rainforest Heroes**

<http://rainforestheroes.com/kidscorner/>

**Rainforest Action Network** <http://www.ran.org/>

**Action Center** <http://www.ran.org/action/>

**What's it Like Where You Live? Rainforests**

<http://mbgnet.mobot.org/sets/rforest/index.htm>

**Tropical Rainforest** <http://www.sci.mus.mn.us/sln/tf/nav/tropicalcluster.html>

**Rainforest Alliance** <http://www.rainforest-alliance.org/>

**Save the Rainforest** <http://www.savetherainforest.org/>

**42explore: Trees and Forests** <http://eduscapes.com/42explore/treesforests.htm>

**ThinkQuest Rainforest Projects by Students**

<http://library.thinkquest.org/J0111765>

<http://library.thinkquest.org/J0112365>

<http://library.thinkquest.org/C0113340>

[http://www.thinkquest.org/library/cat\\_show.html?cat\\_id=216](http://www.thinkquest.org/library/cat_show.html?cat_id=216)

Figure 1-8. Rainforest Unit Resources and Materials (Continued).

**WebQuest Ideas**

<http://www.woodstown.org/~wmslib/SaveQuest>  
<http://www.rainforestsavers.com/rainforestanimalsquest.html>  
<http://oncampus.richmond.edu/academics/education/projects/webquests/drgreen/>  
<http://oncampus.richmond.edu/academics/education/projects/webquests/rainforest/>  
<http://www.mcvts.org/ettc/mentoring/rainforest.htm>  
<http://www.geocities.com/hookerm12000/savetherainforests>  
<http://www.auburn.edu/~rushiaf/titlepage.htm>  
<http://www.sfu.ca/~ftcheng/educ260/>  
<http://www.geocities.com/jazzzer1402536/Intro.html>

**Display Materials****Rainforest Table Display**

Contains products that come from rainforest resources including fruits and vegetables, other foods, spices and flavors, wood, cane, fibers, and resins such as pineapple, orange, lemon, candy bar, tea, cocoa, sugar and chewing gum. This display will be used before, during, and after instruction as a resource in identifying rainforest materials.

**Rainforests of the World poster**

Students will examine a poster called "Rainforests of the World". This poster gives information about where rainforests are located. They will brainstorm about the kinds of products that might come from rainforests based on their geographic location.

**Rainforest Print Materials**

Letter to parents	Rainforest glossary
Directions for rainforest pop-up activity	Directions for science experiment
Rainforest vocabulary sheet	World Map worksheet
Rainforest Products handout	Rainforest treasure hunt
Guidelines for writing a business letter	

**Rainforest Projected Materials****Transparencies**

Layers of rainforest (with overlays)  
 Process of transpiration (with overlays)  
 Creating a chart  
 Parts of a business letter (with overlays)

**Desktop Presentation: Microsoft PowerPoint**

Lesson overview	Rainforest products
Saving the rainforests	

**Supplies**

*Map activity:* Markers

*Rainforest layers activity:* Markers, folders, scissors, tape

*Science experiment:* Potted Plants, plastic sandwich bag, twisty

Figure 1-8. Rainforest Unit Resources and Materials (Continued).



## Building the Treehouse Try It!

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**You're in charge of developing a series of lessons related to one of the topics below. Choose a topic.**

Butterflies  
Gold Rush  
Owning Your Own Business  
Poetry  
Friendship  
Measurement  
Violence  
Basketball  
Endangered Animals

**Your mission is to identify resources that might be used in your lessons. Start by brainstorming places you might find materials you could use as a teacher. Next, consider the possible formats of resources that could be helpful in planning, such as books, videos, software, maps, and websites.**

**Brainstorm places you might find resources for students.**

**Brainstorm materials and supplies that might be needed in teaching lessons associated with this topic.**

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## Identifying Lesson Resources

**Treehouse Tip**

Students need a chance to move around and refocus their attention. Try to "shift gears" either mentally or physically every 10 minutes.

Lessons that involve learning centers or technology use often have two lesson lengths. For example, the large group aspect of the lesson may take only 30 minutes, but students may need the rest of the week to complete the on-computer component of the lesson.

**Lesson Setting.** Consider the environment where you will be teaching. What resources and supplies will you need for the lesson? How will they be arranged? What's the setting of the lesson? In other words, where will the students be situated during the lesson? Will they be seated in rows of desks, at lab tables, or at learning centers?

If students will be moving between areas of the room or school building, how will they be managed? For example, if you've planned thirty minutes for a computer activity in the technology lab, you need to recognize that half that time will be taken lining up students, walking down the hall, and seating students at computers.

Regardless of whether you're planning a single lesson or entire unit of instruction, consider decorating the entire room as part of the theme, topic, or emphasis of the lesson. Items hanging from the ceiling, bulletin boards, windows, and doors will help immerse the students in the lessons. Unfortunately because of other required activities and room changes, this might not be possible. Instead, you may wish to create a learning center in a corner or center of the classroom that contains bulletin boards, table display, print resources, realia (i.e., for a sea creatures unit: aquarium, plankton net, shells, magnifying glass), and space for books, a computer, and other resources.

**Technology Setup.** You'll want to set up technology ahead of time to provide students with as much time as possible to complete the project. The better you plan, the more effectively you'll use the technology. For example, let's say that in your first grade classroom, you're blending a number of strategies to help your children become effective readers. You've found that some students need practice reading books aloud, while others learn more effectively practicing phonics on the computer. If you direct each child to turn on the computer, insert the CD-ROM, choose the activity, and work through the activity, it may take 20 minutes. However if the computer is on, the CD-ROM is in place, and the program is ready for the child, ten minutes are saved for oral reading activities. If you teach each child to use a timer, return to the main menu when they are done, and notify the next child in line, another five minutes can be saved. In other words, if you have limited resources it's important to use them efficiently by setting the computers up ahead of time,



providing students with specific activities, and encouraging students to help each other.

In some cases, additional technology will need to be scheduled or reserved. For example, you might need to schedule the computer lab or arrange access to a computer in the library media center that has Internet access. You might want to arrange for a class set of "Alphasmart" electronic keyboards for writing, a dozen laptops for an outdoor activity, or a set of digital cameras for a field trip. Be sure to make these arrangements well in advance and include them on your lesson plan as a reminder.

Sometimes components will need to be added to your system. For example, you might bring in a digital camera or scanner. Be sure that you test this equipment before turning it over to students. In some cases, you may wish to get students involved with hooking up a video camera or installing software. When planning, consider the time. What's the objective of the lesson? Is the time spent with the technology being used effectively?

Finally, consider the end product as part of your technology setup. Will students be saving on a network, hard drive, or floppy disk? Do students know the procedure for saving? If students will be printing, is paper available? Be sure that your technology is arranged for maximum impact.

### Teaching/Learning Strategies

The next phase in planning is the development of your teaching/learning strategies and their sequence. In other words, what are you and your students going to do during the lesson?

Instructional strategies are plans for helping learners acquire the new capabilities described in your objectives. Let's look at an example. Let's say that your objective is "given a shoe with shoelaces, the student will tie the shoelaces correctly." Assume that most of your students can't tie their shoes. Therefore your students need instruction on tying shoelaces in order to learn this new skill. Before developing the teaching/learning environment, you should prepare a plan for the approach and materials you'll use. What type of instruction will you provide based on the learners' characteristics and needs? How will you gain the students' attention? How will you inform them of the objective? Are there any prerequisite skills they will need help in recalling? Will you provide a demonstration? Will you give students real shoes to tie for practice? Will you provide students with guidance and assistance in their early attempts to tie shoelaces? How will you decrease this outside assistance to the point that they are successful on their own? Will this be individualized instruction or large group instruction? All of these questions should be answered somewhere in your lesson.



#### Treehouse Tip

Good time management is critical in teaching. Anticipate problems and always have a contingency plan.



These strategies are the essential components of a lesson. These elements are:

- Springboards
- Information exploration
- Active involvement
- Closure/transition

**Springboards** are often called kickoffs or hooks. This is the part of the lesson that is intended to gain the learners' attention and prepare them for learning. The **information exploration** component outlines the content in logically sequenced and reasonably-sized chunks and describes the examples to be used to clarify that information. **Active involvement** asks students to think and respond as well as react to feedback from the teacher, other students, or technology. Finally, the **closure/transition** component involves bringing ideas together, reviewing concepts presented, drawing conclusions, and transferring ideas to new situations.

**Springboard.** An effective lesson begins with activities that will interest students and generate enthusiasm. Gaining and maintaining their attention ensures that students' concentration is focused on learning. You could stand on your head, do a dance, or blink the lights, but these are only short-term ways to gain attention. Springboards draw interest that can be maintained throughout the lesson. If students will be learning about fossils, create a display that includes lots of real fossils and show a short video of scientists digging for fossils.

One of the most effective means of gaining and maintaining attention is through motivation. Give students a reason to be interested in your lesson. Discuss how the students will benefit from the skills or knowledge they'll gain from the lesson. Attractive graphics, the purpose and rationale for the lesson, and informative instructions can all be used to gain the learner's attention. Interesting lesson content and structure as well as frequent student interaction can maintain the student's attention throughout the lesson.

Students can be drawn in through the use of new ideas and novel activities. For example, start your lesson with a quote, story, cartoon, historical event, or personal experience. Present a surprising statistic or an emotional appeal. If your lesson will deal with the impact of the Civil War, begin with the casualty statistics. If you're studying poetry, read your favorite poem aloud and see if students can guess why you like it.

"Hook" students by providing a short experience that will persuade students they want to learn more. A demonstration



of the expected performance is another way to begin. In other words, show students an end product or demonstrate the skills. Show the results of a science experiment or a completed product such as a garment or a terrarium. This will be motivating if it's something the students have an interest in learning.

During your springboard activities, it's also important to inform the learner of the objective(s) of the lesson. If the student doesn't know what to look for in a lesson, how will he or she know what's important to remember? Have you ever left a lecture thinking ... "what was that supposed to be about?" If so, the lecturer didn't do a good job explaining the purpose (or objective) of the speech. When the learner knows the objective, he or she can focus on information that will be important for learning rather than "searching" for meaning in the lesson. In other words, tell the student what he or she should be able to do upon completion of the lesson. Also, informing the learner of the objective involves more than simply restating the objective. For example, you could demonstrate the capability you intend for the student to acquire.

Some beginning teachers have a hard time getting the lesson started. Try the following statements:

Today we will ...

When we get done, you'll be able to ...

You'll be creating ...

The discussion of purpose should convince students that the lesson is valuable and relevant. Point out that successful completion of the lesson will help them with future activities. Be certain that they can see the link between past, present, and future learning. You might ask students about their interests in the lessons. Get students involved by asking them to list what they know and would like to know about the topic. Have students make predictions and help them anticipate activities. You could have students complete the following statements:

I hope this lesson (or class) will ...

I hope this lesson isn't ...

I already know ...

I want to know ...

I wonder ...

A question I have is ...

Once you've selected a way to gain their attention and thought of ways to inform students about the purpose of the lesson, it's time to consider ways to help your learners recall prior knowledge. Are there rules, examples, or ideas that the



#### Treehouse Tip

##### **Springboard Elements**

Gain attention

Inform of objective

Recall prior learning



### Treehouse Tip

Students who are bored, distracted, or asleep won't learn much!  
Get them excited, focus their attention, and keep them active!



students can draw on from other classes they've taken? If there are, then they can be applied to this new lesson. Asking students to remember a definition, to imagine carrying out a procedure, or to recall an experience are all ways of having him or her get previously learned skills from long-term memory into working memory. Once in working memory, previously learned skills can be combined with new information to form the new capabilities described in your objectives. While you're activating their prior knowledge, you'll also want to prepare the students for new information, vocabulary, and ideas. Use the following "statement starter" to get your students thinking:

Remember when ...

Can you list (describe, discuss, define, solve) ...?

Have you ever ...?

You might use surveys or short activities to assess student's entry skills and help them recall their prior knowledge. You could ask students to define a word or list examples. You could provide some examples and ask students to categorize them in some way such as yes/no/kindof, appropriate/inappropriate, or related/unrelated. For instance, you could provide students with pictures of snack foods and ask them to categorize the photos into "good" and "bad" after school snacks. This would help them review nutritional information and at the same time determine whether they have the entry skills for your lesson.

You may also want to check for student misconceptions and biases before beginning the new lesson information. Let's say you're teaching a health lesson dealing with AIDS. You could provide students with a series of true and false statements such as "I can't get AIDS from a door knob" or "Only homosexuals get AIDS." Ask students to select the appropriate statement:

I'm absolutely certain it's true.

I'm pretty sure it's true.

I have no idea.

I'm pretty certain it's false.

I'm absolutely certain it's false.

This type of activity can provide you with important information about your students and help you plan lesson activities to meet their needs. A memory matrix is another effective tool in helping students to quickly review their prior knowledge about a topic. For example, you could list particular Spanish verbs and ask students to identify verb endings.

These preinstructional activities serve as the foundation for your lesson. Without these activities, you'll probably begin to

"lose" students early in the instruction. They may become bored because they lack motivation, or they may become confused because they don't have a focus for their learning. A good way to maintain interest throughout the lesson is by involving students from the beginning. Start by having students create a list of things they know about the topic and need to know about the topic. They can add things to their "know" list throughout the lesson. Also consider using advance organizers such as word lists, outlines, formula sheets, and webs to help students visualize the content of the lesson.

Let's look at an example of these preinstructional activities. At the beginning of your lesson, you need to stimulate interest in learning about your topic. Developing the learning center and decorating the classroom is a good start. You may want to set up the beginnings of a full wall mural, organize a scientific inquiry area containing an aquarium, microscope, book, video display, and "touch" display.

Help students connect the topic with their own experiences. Let's say you're beginning a unit on sea creatures. Start a discussion using the following questions:

- Does anyone have a fish tank or aquarium?
- What creatures live in your aquarium?
- Has anyone visited a museum with a large aquarium?
- What sea creatures did you see?
- Has anyone ever been to the ocean? a coral reef?
- How many of you are swimmers? snorkelers?
- Has anyone ever collected shells at the beach?
- Has anyone seen television shows, movies, or read books about the sea?



Help students recall information about creatures, ecology, and the sea they may have learned during previous units. Remind students that they might not know very much about the topics. It's okay, because that's what the unit is all about! Ask students to brainstorm questions they have about those topics. If students have difficulty coming up with questions, intersperse your own questions. Ask students to brainstorm answers to their questions. Don't worry about the "correct" answer. They'll be exploring the information that will help them answer the questions later. Post the ideas in the room for later reference.

Determine which activities fit with the established curriculum outcomes. Then, help students match their interests with particular activities. You may need to develop additional activities or modify activities to address particular interests.

As students find answers to the class questions, direct them to add notes to the master lists. You may also wish to have



students develop journals that contain their personal questions and answers. At the end of the unit, review the progress you've made. Use the original questions to make certain everyone's questions have been answered.

Technology can easily fit into your springboard activities. Let's say you're going to use a videotape, laserdisc, or DVD to help students learn about sea creatures that live in and around the coral reef. You might begin with a large group discussion. Create an information web showing what the class can recall about life in and around the coral reef. Some of the information may come from the video and other ideas from past experiences. Start with the word CORAL REEF in the center. Then, discuss categories of information such as plants, animals, habitat, food, air, and water. Start filling in information. The accuracy of information can be checked later. Remind students that their web deals with the sea and the coral reef rather than the ocean in general. This will help narrow the discussion.



#### Treehouse Tip

Use a variety of information resources. Start with your textbooks, but then read a passage from a book, examine a photograph, or explore a web page.

**Information Exploration.** Information exploration and student involvement comprise the body of your lesson. Students need to locate and process information. They need to practice and create with the teacher's guidance and feedback. Let's start with information exploration and processing. How will students learn concepts detailed in your objectives? What will you teach and in what order? What resources will you use? Will you use a computer program, videotape, books, or lab equipment? Will students be working in a large group, a small group, or individually?

Information exploration environments allow students to locate, select, apply, synthesize, calculate, create, and communicate information. It empowers learners by providing resources and tools needed for learning. The problem becomes how to set up the learning environment to allow exploration and assist students in making wise decisions about sequencing their learning. How much control will students have over the learning environment? Will students have "free reign" or will you structure information and activities to provide students with specific guidelines and resources?

You need to organize information into a form that students can understand. This involves chunking information into units that learners can process effectively. Breaking the content into its logical components is one way of breaking a complex learning task into manageable sequences. By analyzing the content, you should be able to pick out "bits and pieces" or "chunks" of information that can logically be taught together and the order in which they should be taught. The concept of "chunking" is essential in effective instruction. Students should be presented



with small chunks of information. The size of the chunk depends on your students. After being presented with a new idea and an example, learners need to practice their new learning and receive feedback as to their understanding of the content. The information exploration and active involvement components form a cycle that repeats itself throughout the lesson.

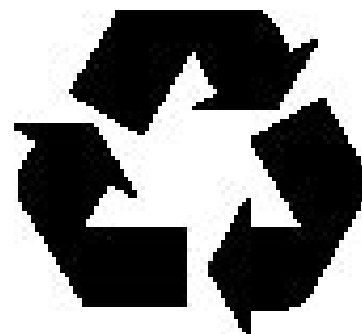
The importance of the information exploration component is obvious. If students are going to learn new content, they need to be allowed to explore new information. In order to form a complete understanding, they also need a variety of examples of the content presented in a logical sequence. They'll need guidance in recognizing patterns, clustering and categorizing information, and elaborating on ideas.

Effective lessons should provide examples and non examples to clarify and illustrate the concept. It's important that students learn the critical attributes or characteristics relating to the concept. In some cases you'll have students discover these attributes on their own, other times you'll describe the characteristics and ask students to identify them in the examples. Students need a range of diverse examples and nonexamples to begin focusing in on the critical attributes of a concept. Otherwise, they'll be able to copy your example, but not really "get" the concept. It's helpful to present information in both visual and verbal forms. Diagrams, instances of concepts, and specific situations where the new learning can be applied also facilitate learning.

You'll want to present information through a number of channels to meet the individual needs of children. Some students learn best through visual representations such as photos, diagrams, and line drawings. Still photographs might be effective in some learning situations, but motion pictures such as videotapes and live demonstrations might be needed to convey meaning. In other cases, print materials containing text-based step-by-step instructions, outlines, summaries, stories, and reports work best. Other students need audio stimulation such as oral presentations, discussions, and audio books to learn efficiently.

Let's say that you're teaching students about recycling. Rather than just talking about it, do it. Bring in recycling bins and demonstrate how to sort items. Students will be learning about what can and can't be recycled.

Some students learn best by exploring information on their own with little adult supervision. On the other hand, many students will need help focusing their attention on particular aspects of the content provided. For example, you might highlight key points (i.e., color, arrows, lines, simplified drawings, type style), develop guiding questions for students to follow as they read, or provide mnemonic devices such as rhymes or jingles



**Treehouse Tip**

Providing lots of different examples using a variety of media will help maintain student interest.

to help students process and store information. You might also provide a variety of problem-solving strategies or models they can try.

Students need opportunities to gather and synthesize information in a supportive environment. Establish non-threatening settings that provide enough time to locate and manipulate information. Students must often rush through their projects without time to consider why they've selected the resources they have. In addition, students need to have success in their explorations. Good project guidelines help, but students may also need to review use of resources. Directions located next to the computer and other resources may help. In addition, encourage the use of a variety of tools and resources including online resources, software, print resources, and live interviews.

Encourage students to think of information in all its forms. Students may use a variety of technology resources to access and communicate information including paper and pencil, video, word processor, desktop publishing and presentation tools, Internet email and websites, digitized audio and video, educational software, scanned images, books, and realia (real items). As educators we often place value on certain types of information and technology. It's important that we don't let students think that information from one source is better than another. In other words, information from the Internet is no more "special" than information from a CD-ROM or print reference. Newer, more "hi tech" resources aren't necessarily better or more timely.

As you're presenting information in the classroom, it's helpful to build in checks of student understanding. You don't want to wait until the end of the lesson to determine whether students are "getting it." Information exploration and active involvement should recycle during your lessons. For instance, you might direct students to read a passage, ask a question, read more, then question more. Provide information, ask students to write, discuss, then write some more. View a video, discuss an issue, watch another clip, then discuss another issue. Notice that it's not just one piece of information and one question. A lesson should include lots of information in small chunks with many opportunities for student interaction.

**Active Involvement.** Effective instruction provides opportunities for the learner to participate and to receive informative feedback. This is one of the most important aspects of your lesson. Without an opportunity to practice, students will not be able to process and apply the new information. Without opportunities for feedback, students have no way to know how they are doing. Your practice should relate directly to your objective. In addition, this practice should be relevant and motivating. Feedback provides students with knowledge about how they

are doing in the lesson and also provides reinforcement for the learner. Students become very frustrated when they are "in the dark" about how they are doing within a lesson.

Provide many examples that students can categorize and provide specific feedback about the accuracy and quality of their work. When teaching principles, ask students to explain, apply, and predict the solution to problems. Instructional support in the form of examples, cues, and hints needs to be quite heavy at the beginning of a sequence and fade as students progress. Learners needing more help can be provided with options to receive further explanations or additional examples.

It's important to track the progress of your students. Are students really learning what you're teaching? To answer this question, you need to see students in action performing the task, discussing the issue, or answering questions about the topic. For example, you might provide pictures of trees and ask students to match the nut or pinecone to the tree.

Active involvement might take a few seconds, a few minutes, or hours to implement. Some teachers use learning logs as a way to track student understanding while others have students respond on cards or slips of paper. For instance, you might use short questions to check student progress. Ask students to list the key words or ideas in the lecture, fill in a chart, write a real-world application of a concept, provide an example, or write about the importance of a concept. Compare student responses to your expectations. How are your students progressing?

Ask students to write about both their successes as well as their frustrations within the lesson. You might find out that most of your students didn't "get" your lesson on feudalism in the Middle Ages. As a result, you'll need to go back and provide additional examples or compare the idea to something taking place in their lives.

Ask students to write about the "muddiest" point in the lecture, or their greatest concern or misunderstanding. It's important not to belittle students or express your dissatisfaction about their lack of understanding, or they'll be less likely to provide honest information in the future. Instead, this information can help teachers plan for remediation and future lessons as well as assist individual students who might need immediate help.

Different types of learning require varied involvement activities. The practice/feedback required in memorizing states and capitals is very different from the learning environment required to make decisions about drinking and driving. Students learning a motor skill will need lots of hands-on demonstrations as well as practice. For instance, you can't just talk about basketball, demonstrate a move, and show a video. Students also need to practice dribbling and shooting with and without a defender.



If students are learning procedures, they'll need skills in identifying, ordering, completing, and demonstrating the steps in the process. Simulation or role-play could be used to help students with attitudinal learning.

In many cases, students are involved in large and small group discussions. They may be discussing a video they just viewed or an electronic book they've explored. When directing these types of discussions, make certain that learners are focusing on high level questions rather than low level "yes/no" items. Let's say that the students just watched the video, laserdisc, or DVD titled **Molly's Pilgrim**. Applying the criterion of Bloom's Taxonomy, analyze the differences between the knowledge and comprehension type questions and the synthesis and evaluation questions.

*Knowledge.* Who is the main character in the story?

*Comprehension.* Describe how the children treated Molly.

*Application.* How did the actions of the children affect Molly?

*Analysis.* Compare Molly's pilgrim with the other pilgrims in the class.

*Synthesis.* Create another ending for the video.

*Evaluation.* How do you think the children in Molly's class might react to a classmate with cerebral palsy? Why?

When planning the active involvement component of your lesson, ask yourself the following questions. What will students be doing or talking about? Will they be participating in a discussion, solving a problem, working on a simulation, or creating a project? Even with a stimulating introduction and interesting content, there is no assurance students will learn by simply listening or reading. Requiring the learner to respond to questions and receive feedback on those responses improves learning. Working with other students will provide opportunities to share and refine their skills. We'll talk more about student projects in the chapter dealing with technology integration later in the book.

Effective student evaluation assists in learning. You need to know whether students can demonstrate the performance stated in the objective to determine whether or not it has been met. You'll want to assess student performance at different points in the lesson. For example before the lesson begins, you may wish to give students an *entry skills test* to determine whether they are ready to begin the lesson. In other words, if students don't have some fundamental skills associated with the new task, they'll be lost. For example, you can't talk about cell reproduction if students don't know the parts of the cell. A *pretest* is another test you may wish to give before a new unit or lesson. This will determine whether students are ready for the concepts you intend



#### Treehouse Tip

##### **Testing**

Entry Skills Test  
Pretest  
Embedded Test  
Post Test

to teach. For example, if students already know about cell reproduction, it's a waste of time to teach it! In the optimal situation, students will score high on the entry skills test and low on the pretest meaning they have the entry skills but still need the lesson. *Embedded tests* are used by teachers to monitor student progress during the lessons. As another example, you might use some of the practice activities as an embedded test to see how students are doing. Many teachers use homework as a way to assure that students are making progress. A *post test* occurs at the end of the instruction to see if students have reached the expected outcome. If the lesson was effective, students should score well on the post test.

**Closure/Transition.** The final step in the lesson involves closure and transition. There's much more to concluding a lesson than saying "we're done." Just as you need an attention-getting introduction, you need to end on a positive note. Begin by summarizing the activities of the lesson and how they relate to the expected outcomes. Review examples, nonexamples, and critical characteristics of the concept. Discuss how their new skills can be applied to many different settings. How do these new skills apply to everyday life? Have students complete a revised listing of what they know and want to know. Ask students to list what they thought was most and least important, most interesting and least interesting, and most difficult or easiest about today's class. You could also ask them about their favorite example, most powerful image, best argument, most surprising fact, or most memorable activity. This information can help review the lesson's elements, but also help students reflect on their accomplishments.

Consider activities that will provide a transition between learning activities. For example, enrichment activities may be designed for successful learners - those students who have demonstrated they have acquired the objectives of the lesson. These activities may enhance the retention and transfer of the information learned. Let's say you have just finished a lesson on nutrition. Ask students to write about how they would explain the nutrition concept to an elderly person. Or explain a tax concept to a group of small business owners.

Likewise, remedial learning activities should be developed for learners who don't achieve the objectives. These activities usually take the form of further explanations, additional examples, and more practice.

### Connection to Outcomes

Earlier you developed objectives to help you identify what you want students to be able to do when they complete your lesson. Hopefully, you used this information in developing your teach-





## Building the Treehouse Try It!

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**Select one of the following topics.**

Butterflies	Gold Rush
Owning Your Own Business	Poetry
Friendship	Measurement
Violence	Basketball
Endangered Animals	

**Create instructional strategies for one, short lesson. Use one generalization or objective as your focus. Include the following elements:**

Learning Environment/Lesson Setting  
Springboard  
Information Exploration  
Active Involvement  
Closure/Transition

**Use the following criteria to evaluate your instructional strategy.**

Was the learning environment described?  
Was the classroom setting described?  
Were springboard activities used to gain student attention?  
Were springboard activities used to inform the learner of the objective?  
Were spring board activities used to recall prior knowledge and skills?  
Was information provided in a logical sequence?  
Was information provided in small chunks?  
Were the format and channels of information appropriate for the content?  
Were students actively involved with the information?  
Were opportunities provided for practice with feedback?  
Did the active involvement match the outcome desired?  
Did the closure activity bring together the elements of the lesson?  
Did the transition activity assist in transfer or preparation for the next lesson?  
Were remedial and enrichment activities discussed?

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ing/learning strategies. How can you be certain that your students accomplished your goal for the lesson? You need a plan for assessing student performance and connecting this information to the outcome you had in mind at the beginning of the lesson.

In order to address the individual differences in your classroom, try a variety of assessment tools. Traditional tests, checklists, rubrics, and scored discussions are just a few of the possibilities. Your plan should address the following questions:

- Does the assessment technique match your goal?
- Is the purpose of the assessment clear to students?
- Is it simple and easy to use and grade?
- Is there enough time for this type of assessment?
- How will students learn from the assessment?
- Will students know their results and have an opportunity for revision?
- Are the directions clear?

**Testing.** Testing is a logical tool for measuring student performance. Criterion-referenced test items are written directly from performance objectives. This type of testing is important to evaluate students' progress and to provide information about the effectiveness of instruction.

Although test items will vary, it is important to remember that the objectives must match the test questions exactly. Without this match, your test items will not be an effective measure of whether students are able to demonstrate the capability described in the objective. Here's an example:

*Objective:*

Shown drawings of cells in various phases of mitosis, the learner will identify the phase as interphase, prophase, metaphase, anaphase, or telophase.

*Sample Test Item Format:*

Examine the cell drawing. Circle the name of the phase of mitosis that is represented.

Examine the cell drawing. Write the name of the phase of mitosis that is represented.

Examine the three cell drawings. Circle the cell in (blank) phase.

When developing test items, you need to think about the type of item that will be most appropriate for the objective. The most common types of test items are recognition and recall type questions. Recognition type questions require the learner to select the correct answer from two or more options. Recall type



**Treehouse Tip**

Tests must match the objectives.

**Treehouse Tip**

Recall Questions  
Recognition Questions

questions require the learner to construct the correct answer from memory.

Recognition type questions are easiest to score. Normally, the student will circle an answer or fill in a dot on a score sheet. For example, the student might be asked to select the correct spelling of a word such as government. They might have four options: (a) government, (b) govermint, (c) goverment, or (d) none of these. Another example of a recognition item might ask students to match words or label a map from words on a list.

When developing recognition type questions, carefully consider the format. The BABOON option is a format that requires the student to be able to identify both examples and nonexamples in the same question. BABOON stands for (Item B, Item A, BOth, Or, Neither). An example of this type of question can be found in identifying clouds. Student may be presented with pictures of a cumulus cloud and a cirrus cloud. They would be asked to identify the cumulus cloud(s). Their options would be Item A is a cumulus cloud, Item B is a cumulus cloud, Both are cumulus clouds, or Neither are cumulus clouds. This is an excellent format for determining whether a student has an understanding of examples and nonexamples of a particular concept.

Matching items are another common recognition type item. In this case, the learner is presented with two sets of information and is asked to match the information. For example, the student might be shown five flags and be asked to match the flag with the correct country.

When developing multiple-choice questions, think about possible distractions. These might take the form of nonexamples or common errors. This is particularly important if you are using the test to diagnose student needs or make lesson assignments. For example on an elementary language arts test, a student might consistently choose "e before i" instead of "i before e". This type of performance demonstrates the inability to apply the appropriate grammar rule.

In some cases, you don't want to give your students options. You want them to construct or "recall" the response from memory. In this case, you may have students write their answer. You need to be cautious when designing these types of questions. Do students know the correct spelling? What will you count correct and incorrect? To determine whether you need a recognition or recall item, examine your objective. If students need to be able to recall a name from memory, a constructed response type question is needed. For example, you would expect all biology students to recall the principle parts of plant and animal cells. You would also want all your nuclear power plant technicians to recall all the steps in their emergency procedures manual.

Make certain that you match the type of test item to the objective. Examine the following objective and test item:

*Objective:*

Students will define biography.

*Item:*

Which of the following is a definition of biography?

- A. nonfiction book about plants.
- B. book about a person.
- C. A book of autographs.

Notice that the objective requires that the student define biography. This is a recall type skill. On the other hand, the test item asks the student to recognize the definition from a list of items. Guessing is possible. Can you think of a better item?

Once you've created test items, you need to consider the development of the test as a whole. How much time do you have set aside for the test? How many items do you need? In what order will the items be placed? What's the probability of guessing. The easier it is to guess, the more items you need. Will different formats of items be separate or mixed? What about student directions? You'll want to scramble the items and vary the location of the correct answer; the letter "B" shouldn't be the "correct answer" every time. Although scrambling your items is a good idea, it's helpful for the student to have the items grouped by question type. For example, all of your recognition type questions may comprise the first section of your test. Otherwise, the students may be distracted during the test by shifting their thinking from one item type to another.

When developing tests, the creation of clear and consistent directions is critical. If a student doesn't know exactly what to do in a testing situation, the instructor will not get a clear indication of what the student knows. Directions should provide any instructions necessary for completing the test.

Directions should show and tell the student what to do and how to do it. Present a sample problem, so that students can see the format of the test. Remember, if the directions are not clear, a student can lose time, patience, and motivation within your test.

When designing directions, make a list of the steps students will need to follow to complete the problem. Then, check the sequence of these steps. Avoid obvious or overly wordy directions. For example, "read the question carefully" is adequate. "Read and reread the question until you have a complete understanding of what the question is asking" is too wordy. Write the directions below the student's reading level and avoid "tricky" words that might be confusing.



#### Treehouse Tip

##### **Test Considerations**

Testing Time  
Number of Items  
Probability of Guessing  
Mixing Test Questions  
Directions



### Treehouse Tip

#### **Alternative Assessments**

Quantitative scales  
Rating scales  
Scored discussions  
Contracts  
Checklists

**Alternative Assessment.** In many cases, a test is not the most effective means of assessing student performance. Instead, you may wish to use alternative forms of assessment. Role playing, case studies, and simulations are all ways to see how students will react in a particular situation. How do you "grade" this type of activity? Quantitative scales, rating scales, scored discussions, contracts, and criteria checklists can easily match an activity or assignment to most objectives. Is the student able to perform the objective in the situation presented?

Procedures, experiments, demonstrations, papers, and projects are often assessed using a criterion referenced checklist. First, you develop a list of expectations, then create a scale to rate the performance. If the student completes the item to your satisfaction, they receive some level of credit for the item. Scales can be simple or complex. Simple checklists contain YES/NO type items such as "Was the spoon placed to the right of the knife?" More complex scales include ranges of acceptable performance. The most complex checklists contain rubrics for each item. Rubrics are precise listings of expectations at each level of performance. For example, a written document may be classified as excellent, acceptable, or unacceptable. The rubrics provide examples of what is meant by each level so a teacher and student can easily distinguish between high and low quality performance.

There are hundreds of other ways to assess student performance. One way to check student growth is by asking students to demonstrate their understanding of a concept visually. Concept mapping or webbing is a way to see how students "think" about the information they've learned in the lesson.

For some objectives, teachers prefer an assessment tool that provides long term information about the student. The teacher wants to see progress over time and evaluate the process as well as the final product related to an objective. Journals, logs, progress reports, blogs (web logs) and portfolios are effective ways for students to select ideas, reflect on their work, and write about their perspective.



### Internet Connections

#### **Online Rubric Makers** **Rubistar**

[rubistar.4teachers.org/](http://rubistar.4teachers.org/)  
**Teachnology**  
[www.teach-nology.com/web\\_tools/rubrics/](http://www.teach-nology.com/web_tools/rubrics/)

### **Learning Environments & Individual Differences**

We all have strengths and weaknesses. A key to developing an effective teaching / learning environment is building on these strengths and overcoming weaknesses. To do this we must analyze how our students learn best and develop effective instructional strategies to meet these needs. Unfortunately this can be difficult because each child is unique. What works for one student may be ineffective for another learner. A teaching strategy that works for the educator next door, may not work for you. To understand why these differences occur, we need to explore our intelligences and learning styles, then apply these to teaching.



## Building the Treehouse Try It!

**Select one of the following topics.**

Butterflies

Owning Your Own Business

Friendship

Violence

Endangered Animals

Gold Rush

Poetry

Measurement

Basketball

**Write at least three objectives related to one of these topics.**

**How would you determine whether your students reached your objective?**

**Choose one of the following activities.**

Write a test question to match each objective.

Write a checklist that could be used to check student performance.

Develop an alternative way to determine whether students met objectives.

**What would you collect from students? Why? How would it be used?**

**What would you record or keep track of to demonstrate student knowledge and skill? How would this information be used in grading?**

**Use the following criteria to evaluate your connections.**

Did the assessment tools selected match the objectives?

Was student work collected or evaluated?

Were specific ideas for recording assessment results discussed?

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## Creating Connections to Outcomes





### Treehouse Tip

#### Multiple Intelligences

verbal-linguistic  
logical-mathematical  
visual-spatial  
musical-rhythmic  
bodily-kinesthetic  
interpersonal-social  
intrapersonal



### Internet Connections

#### Multiple Intelligences Teacher Tap

[eduscapes.com/tap/  
topic68.htm](http://eduscapes.com/tap/topic68.htm)

#### Cultivating MI

[http://glef.org/php/article.  
php?id=Art\\_957&key=005](http://glef.org/php/article.php?id=Art_957&key=005)

#### Tapping into MI

[http://www.thirteen.org/  
edonline/concept2class/mi/  
index.html](http://www.thirteen.org/edonline/concept2class/mi/index.html)

#### Howard Gardner

[http://pzweb.harvard.edu/  
Pls/HG.htm](http://pzweb.harvard.edu/Pls/HG.htm)

Gardner defines intelligence as the ability to solve everyday problems, generate new problems, and offer a service or resource to society. In *Frames of Mind*, Howard Gardner (1993) of Harvard University discussed his theory of multiple intelligences emphasizing that individuals don't just have one fixed intelligence. Instead, at least seven distinct intelligences may emerge over a lifetime including verbal-linguistic, logical-mathematical, visual-spatial, musical-rhythmic, bodily-kinesthetic, interpersonal-social, and intrapersonal-introspective. Two others were later added including naturalist and existentialist.

**Verbal-linguistic (words).** Good readers and writers or students who are keenly aware of the nuances, order, and rhythm of words are showing their verbal-linguistic intelligence. They can "think" in words and use language to express their ideas.

**Logical-mathematical (numbers/problem solving).** The ability to solve complex mathematical problems, manipulate abstract patterns and relationships, and reason inductively and deductively are skills associated with logical-mathematical intelligence.

**Visual-spatial (pictures/images).** Students who are able to create visual-spatial representations of the world and "think in pictures" are said to have visual-spatial intelligence. These students "think" in three-dimensions and can easily recreate, transform, and modify images to meet their needs.

**Musical-rhythmic (tone/rhythm/timbre).** A sensitivity to music including the pitch and the rhythm of sounds is a sign of musical-rhythmic intelligence. These people pick up melodies and always seem to "think" in music and sounds.

**Bodily-kinesthetic (movement).** Using the body to express ideas or emotions, develop materials, and solve problems is the focus of the bodily-kinesthetic intelligence.

**Interpersonal-social (social understanding).** The ability to work well with others, empathize with the goals, motivation, and purposes of others are signs of this intelligence.

**Intrapersonal-introspective (self-knowledge/metacognition).** Students who are deeply aware of their own feelings, abilities, goals, and purposes are demonstrating their intrapersonal-introspective intelligence.

Everyone has a combination of these intelligences and is capable of growth in all the areas. As a teacher, it's important to be aware of your own intelligences as well as those of your students. Use the multiple intelligences to add variety to your classroom, motivate students, and develop new areas of skill.

Help students use their strengths to develop their weak areas. Let's say a student is asked to write a paper about the characters in a novel. You might encourage a student who does



well with visual-spatial tasks to begin by drawing a diagram showing the relationships between characters. They can use this as a guide in their writing.

Start by becoming aware of your own intelligences. If you're a person who learns best through the logical-mathematical intelligence, you may develop more activities for this area. However, remember that your students may be strong in other areas. As you develop curriculum, focus on meeting the needs of a wide range of student learning styles by applying the intelligences. For example, you may like to plan projects using a traditional outline format. However you may find that some students are better able to express their ideas through a visual map, series of note cards, web of ideas, or a verbal brainstorming session.

### Technology and Multiple Intelligences

Technology can play a central role in meeting the diverse needs of your learners. The varied channels of communication represented in educational technology can be matched to particular intelligences. Consider technologies that might help a student strengthen an area of intelligence. For example, let's say students are practicing science vocabulary. Some students might learn most effectively by hearing the words pronounced aloud. A computer or tape recorder could help a student listen to a recording created by a teacher or record and playback their own voice. Another student might like to see a picture of the science object and click on the visual to hear the word. A multimedia software package would work well for that student.

Technology can be a motivating way for students to cross intelligence areas. For example, let's examine a student who hates reading, but does well in musical-rhythmic, visual-spatial, or bodily-kinesthetic. Interactive reading software that extends reading to include music, pictures, and movement may foster learning. In the same way, a student who does well in verbal-linguistic may have a hard time making friends and interacting with others. Use written communication through email technology to help this student increase his or her interpersonal-social intelligence. Since the learner is comfortable with writing but uncomfortable with "live interaction", the email communication can be one step toward developing live interpersonal relationships. The next step may be written, live chats. Then, add video and audio elements. Live interactions may come more easily once the student becomes comfortable communicating their ideas to others.

Technology can support all of the intelligence areas. The logical-mathematical area can be developed through the use of software such as **Millie's Mathhouse** and **Math Workshop**. Educational software tools such as **The Crunchers** and **The Geometric Sketchpad** can help students develop spreadsheets



and models, organize information, try out ideas, and solve math problems. Simulation software like **Science Sleuths** helps students investigate problems and test hypotheses. Internet-based simulations and other online activities can provide practice in problem solving. Internet can also be used as a way to collaborate on scientific experiments. For example, students living at three different geographical elevations could compare the results of chemistry experiments through email. What's the effect of altitude on baking? Why?

Displays that contain manipulatives can help promote skills in classification and other important math and science skills. Technology can be used to record and analyze data during these hands-on activities.

Technology in the verbal-linguistic area includes resources that support the reading and writing area. A writing center could include a computer and writing software, paper and pencils, and project starters. Software such as **Student Writing Center** and add-one to Microsoft Word such as **Scholastic Keys** provide easy-to-use writing and editing tools for children. Word processing allows students to easily follow the writing process (see Figure 1-9). They don't have to worry about "erasing" and "rewriting" because these steps are no longer a chore. In addition, the final printed copy is professional looking, polished, and something students are proud to display.

Learners love to explore information presented in books and websites, so develop a research area in your classroom where students can search for answers to their academic questions. Many teachers develop a language area with tape or digital audio recorders/players, earphones, and books on tape or CD.



Figure 1-9. Scholastic Keys.

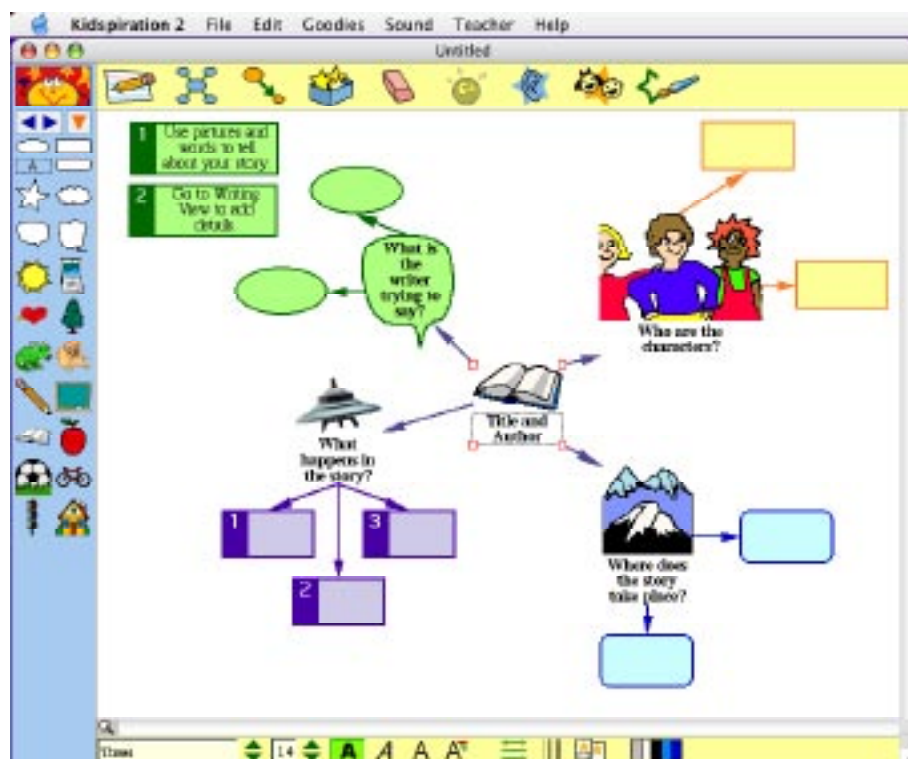


Figure 1-10. Kidspiration template.

Technology can also assist students who have trouble expressing themselves because of a range of disabilities. Specialized hardware and software can assist visually, hearing, or physically impaired students communicate more effectively.

Technology can also be used by teachers to develop and revise print materials such as step-by-step instructions, sample writing projects, and printed activities.

The visual-spatial intelligence can incorporate many technology resources. Start with simple tools such as paper, markers, and crayons to help students visualize ideas in the form of concept maps, mindmaps, webs, and clusters. **Inspiration** and **Kidspiration** are two great tools for visual learners. They help students brainstorm and organize ideas visually. Figure 1-10 shows one of the templates provided in **Kidspiration** to help students visualize a story before they begin writing.

Videos, photographs, and other visual media are associated with this area. Students can view materials created by others, or develop their own visual productions using video cameras, color scanners, digital cameras, and other technology. While some students prefer to create their projects with traditional tools such as pencils, markers, and paints, others use computer-based graphics tools such as **KidPix** for visual expression. Software programs such as **KidCAD** help children design projects in 3D. Clip Art CDs provide lots of visuals to illustrate student projects. Websites like the *Library of Congress* contain wonderful historical photos and other visuals (see Figure 1-11).

[The Library of Congress](#)



[Nebraska State Historical Society](#)

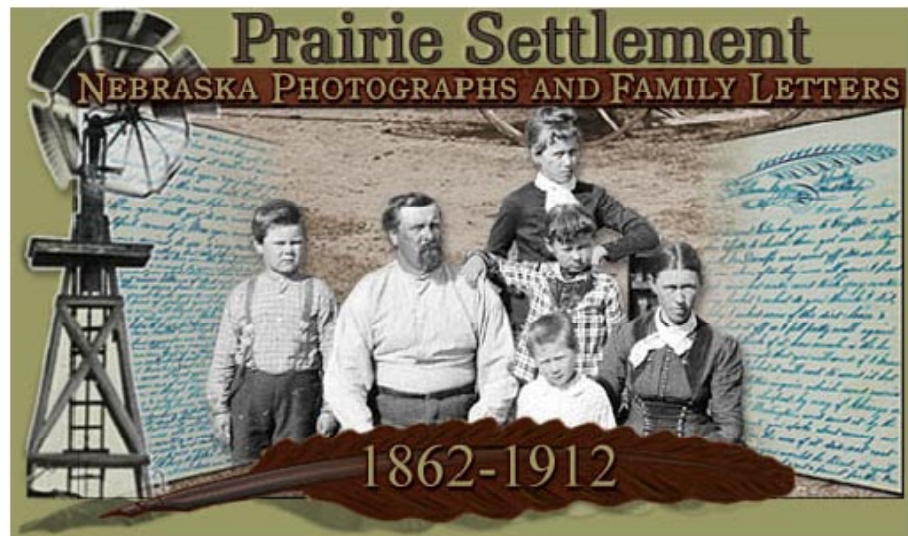


Figure 1-11. Library of Congress. American Memories website.

Students put all these elements together and develop multimedia projects in **HyperStudio** and **PowerPoint**. Some students become involved with more high-end tools such as Adobe **PhotoShop** for editing visuals (see Figure 1-12) and Adobe **Premiere** or Apple **iMovie** for video editing.

Although many people view technology as passive, it can actually play an important role in the bodily-kinesthetic intelligence area. Technology tools such as the computer mouse, keyboard, light pen, GPS device, scientific probe, video camera, and hand scanner encourage students to use their fine motor skills to developing hands-on projects. Robotic activities such as Lego Logo projects combine hands-on building activities with computer technology. The eye-hand coordination and active participation involved in using the technology can be reinforcing for a student who might not normally choose the content related to the hands-on activity.

Many students enjoy watching themselves on video whether they're dancing, playing a sport, or acting in a skit. Video is also a great way to document student performance. While other intelligences are expressed on paper or through music, videotape is the most effective way to capture a student's movements.

Displays and learning centers can be designed to provide space for movement and objects to touch and explore. Design activities that involve students in drama, dance, or creative movement. Even short skits and debates can get students moving and expressing themselves in physical ways.

Field trips are a great concrete learning experience. Use technology such as video cameras, digital cameras, and portable



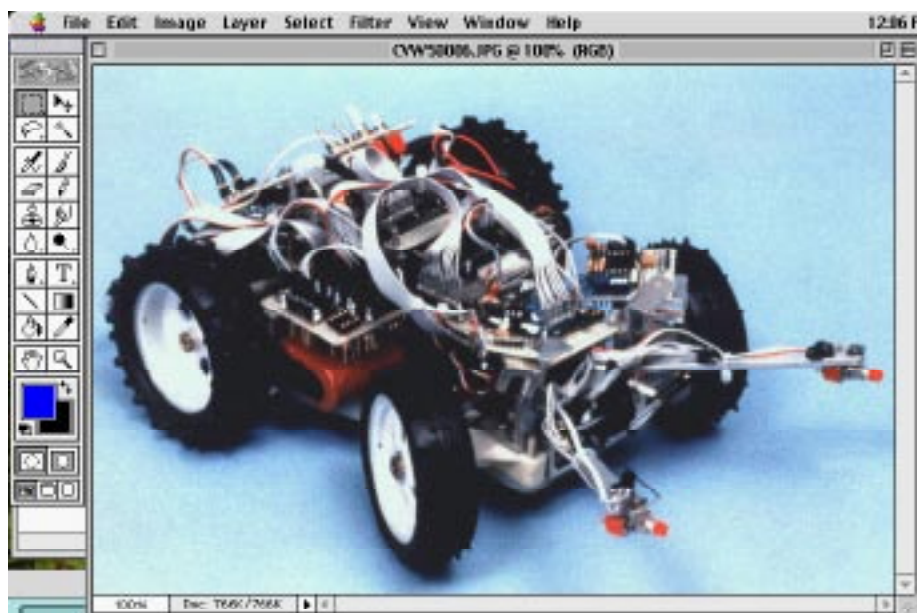


Figure 1-12. Image in Adobe Photoshop.

computers to record and reflect on these experiences. Field trips don't have to involve physical movement to be effective. Virtual field trips can give students the feeling of exploring the Arctic or looking inside a volcano without having to leave the classroom. Virtual field trips use the Internet to bring scientists, experiments, and exploration into the classroom. By asking questions, running robots by remote control, and following a travel schedule, students play an active role in the experience. Virtual reality adds an even more kinesthetic aspect to these activities.

The musical-rhythmic intelligence focuses on sound. A music area that includes tape and digital recorders, CD-audio players, and sound-making objects and instruments can help students explore sound. Educational software such as **Juilliard Music Adventure**, **Making Music**, and **Songworks** provide resources for exploring and creating music.

Students can develop great multimedia projects that incorporate original tones, rhythms, and timbre. They can also use digital sound effects CDs and other sound resources to add background sounds to stories, plays, and other productions.

Use technology to enhance the interpersonal intelligence. Small group computer activities encourage students to collaborate. Many simulations require students to work as a team to solve a problem or explore an issue. Software such as Tom Snyder's **Decisions, Decisions** series focus on social or environmental issues. Get students involved with online communication where they can telecommunicate with other learners around the world on important issues and problems.

Use technology as a tool to help students enhance their interpersonal intelligence. Some students feel uncomfortable speaking in a group setting. Using video or audio recordings during rehearsal and practice can make students feel more confident.



#### Treehouse Tip

Match the technology with the needs and interests of your students.

The intrapersonal intelligence can also make use of technology. For example, computers are great tools for reflective journal writing or drawing pictures about their feelings. Videotape is also a good tool for self-analysis. You can tape a small group discussion and ask students to watch, analyze, and reflect on their actions.

Flexibility is the key to designing learning environments that focus on a range of intelligences and technologies. Your class is involved with creating skits or short plays that focus on a particular genre such as tragedy or irony. One group might use the software called **Hollywood** to develop and perform a play all on the computer screen including sounds, narration, and animated characters. Another group might use technology for writing a script or building a storyboard, then use a videocamera to record their sounds and movements. A "rock opera" might be the product of a third group that uses a keyboard hooked to the computer as background music for a modern song and dance project. They would all learn about the creation of a drama, but each group might apply their intelligences a different way.

Develop activities that ask students to apply their intelligences in meaningful ways. In your attempt to incorporate every area, you may have a difficult time identifying activities or you may simply not have the time in a lesson to allow multiple projects. Don't worry. You don't need to incorporate all seven into every lesson. Instead look at your unit as a whole. Do you meet the learning needs of your students? Do you provide a variety of activities that draw on student strength areas and develop weak areas? Do you use a variety of communication channels and types of media?



### Internet Connections

#### **Differentiation**

##### **HOTT LINX**

[curry.edschool.virginia.edu/hotlinox/](http://curry.edschool.virginia.edu/hotlinox/)

### Lesson Planning and Differentiation

As you develop lesson plans, consider the individual differences of your learners. In the book *The Differentiated Classroom*, Carol Tomlinson states that differentiation involves identifying and planning for these differences. A differentiated classroom provides varied avenues to acquire, process, and make sense of information and ideas to maximize student learning and to promote individual success.

Differentiated lessons allow struggling learners as well as advanced learners to experience appropriate levels of challenge by targeting instruction at the readiness level of each child.

### Formative Evaluation

Before conducting a lesson in your classroom for the first time, you need to determine whether it will be effective. Formative evaluation is the process of determining whether your lesson needs to be revised before use. In the "real world" formative





## Building the Treehouse

### Try It!

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#### *Activity 1: Knowing Yourself*

Explore your intelligences. Focus on your strengths and weaknesses. Address each of the following statements for each of the seven intelligences.

I'm strong in. I'm weak in. I like. I dislike. I learn best. I learn least. I find myself...

Verbal-linguistic

Logical-mathematical

Visual-spatial

Musical-rhythmic

Bodily-kinesthetic

Interpersonal-social

Intrapersonal-introspective

What are your strong and weak areas? How might this impact your teaching? What areas do you want to develop? Why?

#### *Activity 2: Knowing Your Students*

Interview a student. Can you identify their strengths and weaknesses in the seven areas? Guess what types of activities they like and dislike. Were you right? Brainstorm some activities that might be useful in drawing on their strengths and improving their weak areas. How would you incorporate technology?

#### *Activity 2: Exploring Lessons*

Explore an existing lesson. Pick out good examples of the intelligences. Can you think of activities that could be added to the lesson that would focus on additional intelligences?

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## Identifying Multiple Intelligences



## Building the Treehouse Try It!

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Select a lesson topic and brainstorm ideas for involving multiple intelligences.

**Verbal-linguistic:** How can spoken or written words be used?

**Logical-mathematical:** How can numbers, calculation, reasoning, logic, classification, or problem solving be incorporated?

**Visual-spatial:** How can visual elements such as pictures, graphics, art, color, metaphor, maps, or visual organizers be integrated?

**Musical-rhythmic:** How can sounds and music including tone, timbre, rhythm, or melody be used?

**Bodily-kinesthetic:** How can movement and hands-on experiences be incorporated?

**Interpersonal-social:** How can sharing, cooperation, teaming, and collaboration be used?

**Intrapersonal-introspective:** How can personal feelings, thoughts, and reflections be used?

### Sample Lesson Idea: Tall Tales

The teacher begins by showing a short video on the topic of tall tales. Tall tales are defined. The class discusses tall tales they've heard.

Lesson ideas: <http://42explore.com/talltale.htm>

**Verbal-linguistic:** Children choose a tall tale book to read. In pairs, children explore the electronic book *Pecos Bill* or *Paul Bunyan*. They can also read tall-tales online. Students write tall tales using the software **Microsoft Word** or **Student Writing Center**. Student submit their tales to an online sharing project such as the ones organized by Susan Silverman at <http://kids-learn.org/>

**Logical-mathematical:** Students create math story problems and puzzles based on their own tall tales. Share these problems through email with another class.

**Visual-spatial:** Students plan their tall tales using **Kidspiration** software or illustrate their tall tales using KidPix. They also design costumes for their tall tale production.

**Interpersonal-social:** Students compare their tall tales with a small group. In teams, they combine their tales on a word processor into one super tall tale that incorporates all the characters.

**Musical-rhythmic:** Students listen to tall tales that have been turned into songs. They use rhythmic instruments to add background music to their skit.

**Bodily-kinesthetic:** They make costumes for their tall tale production. Students adapt their super tall tale into a creative drama that is videotaped.

**Intrapersonal-introspective:** Students write in their journals about a personal experience that could be turned into a tall tale.

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## Exploring Multiple Intelligences

evaluation is difficult. There's not enough time in the day to try out everything on an individual or small group before you do it in class. However, you'll find that conducting some level of formative evaluation can be a life saver.

An important first step in formative evaluation is checking the accuracy of your materials. Is all the information students will be exploring available, well-organized, and accurate? You can check this information yourself, get another teacher to check it over, or ask an advanced student to review materials. The idea is to make sure your subject matter materials are accurate. It's easy to get so close to your materials that you miss small errors, so it's a good idea to have someone else look at them.

A second way to evaluate your materials is called one-to-one evaluation. This serves as a way to identify major and minor problems with the use of your materials. Try your lesson on a "high" and "low" ability student or motivated and unmotivated students to test your materials. How long does it take them to complete the activity? What aspects do they find easy or difficult? Where do they need more information or examples? Talk with the children as they're using the materials and ask what they're thinking. You need to set your students at ease so that they realize they are testing the system, not actually being tested for "grades" or how well they do.

It's also a good idea to try your lesson on a small group before you try it with the entire class. A small group is nice because you can test classroom management strategies and student interactions. Again, you can't do this with every lesson, but it's a good opportunity to test it out and make revisions before using it on an entire class.

You probably can't conduct a one-to-one or small group evaluation on every lesson, but it's a good idea to try out activities you're using for the first time. Let's say you're going to have each child build their own "mini" volcano. You might find that 22 "mini" volcanoes take too much time and are a huge mess. Instead you might try it as a small group activity.

## Conclusion

Lesson planning is a lot of work, but worth the investment of time. Figures 1-13 and 1-14 show examples of lesson plans. The first example from a high school economics class deals with the functions and characteristics of money. The lesson is self-contained and few resources or materials are used.

The second lesson from an elementary classroom uses a variety of resources and ongoing learning centers.

There are many ways to plan for instruction. This chapter has provided an assortment of ideas. Use the lesson plan format that fits best with your learning outcomes and teaching style.



### Treehouse Tip

#### ***Formative Evaluation***

Subject Matter Experts

One-to-One

Small Group

## Lesson Plan: Functions and Characteristics of Money

### Learners

This lesson is geared to juniors and seniors enrolled in an economics course. The class contains twenty-one students. The course is an elective, so interest is high. Students enjoy learning about money, so maintaining attention should not be easy.

### Expected Outcomes and Purpose

**Standard.** Students will understand the role of money and financial institutions in a market economy.

**Purpose.** This lesson is the third day of a Money unit. Students need to know the function of money in order to understand how the economy works.

**Concepts.** Money

### Generalizations.

Money is easily transported, divisible, not easily reproduced, and durable.  
Money is a medium of exchange, store of value, and unit of measurement.

### Objectives

When given examples of money, students will determine which function(s) and characteristics of money are involved.

### Lesson Resources and Materials

**Textbook and Student Guide** - Chapter 10

**Purposes and Functions** - Federal Reserve booklet

Explains what money does and how the Federal Reserve controls the supply of money in the economy.

**42explore: Money** <http://42explore2.com/money.htm>

**42explore: Economics** <http://42explore2.com/econ.htm>

PowerPoint Presentation or Transparencies

Optional: Timeliner software by Tom Snyder Productions

Handout

**Realia.** Shells, stones, coins, loaf of bread, silk shirt, pelt, jar of spice, money, expired credit cards, sample checks

### Learning Environment/Lesson Setting

**Lesson Length.** The lesson will take three class periods.

**Lesson Setting.** A table display contains objects that will be used in a demonstration. Students are seated at their desks in clusters facing the front of the classroom.

**Technology Setup.** Use the Visual Presenter document reader and data projector to show small money and objects (reserve ahead).

Figure 1-13. Sample Lesson Plan.

**Teaching/Learning Strategies**

*Notice the technology enhancements that are incorporated as resources are available.*

**Springboard**

Ask students about their use of money. Do they have cash? Do they use an ATM machine? Have they used a credit card? Hold up a seashell and ask students what it would be like to use shells as currency. What about stones, bread, or coins? Ask students to imagine the problems of using a loaf of bread to buy a pair of tennis shoes or a beaver pelt to buy provisions. Explain that this lesson will help them understand the function and characteristics of money. Recall the definition of money.

*Technology Enhancement:* Show items on the document reader.

**Information Exploration**

Trace the history of money using the bulletin board timeline.

*Technology Enhancement:* Use Timeliner software and a data projector to show a digital timeline you've produced.

Discuss the characteristics of money (easily transported, divisible, not easily reproduced, and durable) using a set of transparencies printed from PowerPoint as a guide.

*Technology Enhancement:* Use a PowerPoint presentation with a data projector.

Describe the function of money (i.e., medium of exchange, store of value, unit of measurement).

*Technology Enhancement:* Using Inspiration and the data projector, use questioning techniques with students to generate information regarding the function of money.

Distribute the review sheet containing a timeline and characteristics.

*Technology Enhancement:* Provide a web-based pathfinder containing a review sheet and links to optional readings and interesting resources.

**Active Involvement**

Students will complete section 10.3 in their study guide using the booklet *Purposes and Functions* as a reference. This activity examines four case studies involving the function and characteristics of money.

In small groups, ask students to invent a new monetary system for the United States. They should describe the benefits and drawbacks of their system. Small groups will share their ideas with the group.

*Technology Enhancement:* Ask students to create 4 slide PowerPoint slideshows to support their monetary system presentation.

**Closure/Transition**

Review the importance that money has in our society and preview the next lesson: making money. Ask how many people would like to win the lottery. Why? How do they make so much money on the lottery?

Figure 1-13. Sample Lesson Plan (Continued).

## Lesson Plan: Carnivores, Herbivores, and Omnivores

### Learners

The class consists of twenty-six fourth graders between the ages of 8 and 11.

**Entry Skills.** The students can identify common types of animals, their habitats, and their characteristics. They have used DVDs, Internet, and HyperStudio before, so no software instruction is needed. Review sheets are available for extra help.

### Expected Outcomes and Purpose

**Purpose.** The unit will teach the concept of food chain and web. Having the concept of "food chain" is essential to understanding how the environment functions. Without the concept of food chain, students will have difficulty understanding the interdependency of living things. Being able to identify carnivores, herbivores, and omnivores is important in understanding how the food chain works.

**Standard.** Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem.

**Unit Concept.** The food chain and web.

### Lesson Generalizations.

Carnivores, herbivores, and omnivores are important parts of the food chain and web.

A carnivore is an animal such as a dog, a lion, a fox that only eats other animals.

A herbivore is an animal such as a horse, a giraffe, and a deer that only eats plants.

An omnivore is an animal such as a bear and a human that eats both plants and animals.

A predator is an organism that kills and eats other organisms.

A prey is an organism that is killed and eaten by a predator.

### Objectives

The student will describe characteristics of and provide examples of carnivores, herbivores, and omnivores.

The student will demonstrate the relationship between predator and prey.

Given pictures of animals, the student will correctly identify each animal as a carnivore, herbivore, or omnivore.

The student will create and draw an animal, real or imaginary, that has at least two characteristics of a carnivore, herbivore, or omnivore.

### Lesson Resources and Materials: Books

Aaseng, Nathan (1987). **Meat-eating Animals.** Learner.

Aaseng, Nathan (1987). **Prey Animals.** Learner.

Batten, Mary (1992). **Nature's Tricksters.** Sierra Club Books.

Bender, Robert (1994). **A Most Unusual Lunch.** Dial Books for Young Reader.

Bennett, Paul (1994). **Catching a Meal.** Thompson Learning.

Brooks, Bruce (1991). **Predator!** Farrar Straus Giroux.

Cleave, Andrew (1995). **Hunters.** Steck-Vaughn Company.

Kalman, Bobby (1998). **What are Food Chains and Webs?** Crabtree Publishing.

Kitchen, Burt (1994). **When Hunger Calls.** Candlewick Press.

Lauber, P. (1995). **What Eats What? Food Chains and Food Webs.** Harper Trophy.

Norgaard, E. Jaediker (1990). **Nature's Great Balancing Act.** Cobblehill Books.

Wilkes, Angela (1994). **Incredible Great Hunters.** Covent Garden Books.

Figure 1-14. Sample Lesson Plan.



**Lesson Resources and Materials: Educational Software****HyperStudio** by Roger Wagner

Allows students to create stories that incorporate text and graphics.

**Lesson Resources and Materials: United Streaming Videos**

**Concepts in Nature: Animal Predators and the Balance of Nature** by United Learning

**Investigating Dinosaurs: Predator or Prey** from Discovery Channel

**Life of a Forest, The: A Forest Grows Old** by United Learning

Chapter on carnivores, herbivores, and omnivores

**You in the Food Web** by United Learning

**Lesson Resources and Materials: Internet Sites and Electronic Databases****Dinosphere: Meat and Plant Eaters**

[http://www.childrensmuseum.org/dinosphere/games/earlyreader/earlyReader\\_3.htm](http://www.childrensmuseum.org/dinosphere/games/earlyreader/earlyReader_3.htm)

**Interdependence & Adaptation** from BBC

[http://www.bbc.co.uk/schools/scienceclips/ages/10\\_11/interdependence.shtml](http://www.bbc.co.uk/schools/scienceclips/ages/10_11/interdependence.shtml)

**Food Chain** from Planet Pals <http://www.planetpals.com/foodchain.html>

**Food Webs and Chains** <http://www.vtaide.com/png/foodchains.htm>

**Food Web Kids** [http://www.gould.edu.au/foodwebs/kids\\_web.htm](http://www.gould.edu.au/foodwebs/kids_web.htm)

**Spotlight on Food Web** <http://oceanlink.island.net/oinfo/foodweb/foodweb.html>

**BrainPop: Food Chain** <http://www.brainpop.com>

**EBSCO: Animals Electronic Database****Lesson Resources and Materials: Print Materials**

Vocabulary Review Sheet - Contains vocabulary and definitions

HyperStudio Project Checklist

**Lesson Resources and Materials: Supplies**

Animal Skulls

**Learning Environment****Lesson Length**

45 minutes for overview

The centers will be used over a two week period

**Lesson Setting**

The students are at their desks for the overview and at learning centers for active involvement activities.

**Technology Setup**

The classroom contains five, wireless laptop computers. Three computers are used for Internet and database research. Two computers will be used in the production area. Students will have two forty minute periods at each center. The skull activity will only take about 20 minutes. Students completing work before the allotted time will work on their reading project.

Figure 1-14. Sample Lesson Plan (Continued).

**Teacher Activity Sequence****Springboard**

If you were an animal, what would you order at Burger King? Do animals eat the same foods we do? What kinds of foods do animals eat? What do you think lions eat?

Tell the students that they'll learn to identify the kinds of foods animals eat by learning the about carnivores, herbivores, and omnivores.

Write the words carnivore, herbivore, and omnivore on the board. Ask students if anyone can define these words.

**Information Exploration**

Discuss the characteristics of the carnivore, herbivore, and omnivore including skull, teeth, placement of eyes, and body structure differences using a PowerPoint Presentation.

Show a series of still pictures and identify whether they are carnivore, herbivore, or omnivore. Provide additional examples and ask students to identify characteristics.

Pass out the vocabulary handout for the students to use while working on their project to assist with definitions and spelling.

**Active Involvement**

Students will participate in three learning centers.

**Center 1: Skull identification**

Match the skull characteristics with the animal skulls.

**Center 2: Reading Center**

Students will read a book that involves the food web and complete the reading project.

The guidelines for this project are in a handout provided in an earlier lesson.

**Center 3: Information Exploration**

Students will use Internet resources and electronic database listed in the resources section to explore information about a carnivore, herbivore, or omnivore.

Each student will select an animal and discuss characteristics associated with being a carnivore, herbivore, or omnivore such as retractable claws or big ears.

**Center 4: HyperStudio**

Each student will create an animal that has at least two characteristics of a carnivore, herbivore, or omnivore. These characters will be included in a group story about the animals written in HyperStudio. Students will have the option to draw their animals on the computer, or use paper and markers and scan the pictures.

**Closure/Transition**

The lesson will end with a game that reviews the types of animals and the "foods" they might order at a fast food restaurant for animals.

**Connection to Outcomes**

**Students Work:** We will be having a HyperStudio sharing time. Collect student projects on the hard drive.

**Teacher Records:** A checklist will be used to evaluate the projects. Record whether they included two characteristics in their HyperStudio project.

Figure 1-14. Sample Lesson Plan (Continued).



## Building the Treehouse Try It!

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**Evaluate a lesson that was prepared by another teacher.**

**Answer the following questions.**

Would you use this lesson? Why or why not?

What are the strengths of the lesson?

What are the weaknesses of the lesson?

What would you change in the lesson?

Did the plan address the multiple intelligences of the learners? If so, how? If not, what could be added or changed?

Was enough information provided so that you could teach this lesson? If not, what additional information would you need?

**Use the criteria on the next page to evaluate another lesson.**

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## Evaluating a Lesson Plan



## Building the Treehouse Try It!

**Create a lesson plan. Use the criteria below to evaluate your lesson.**

### **Learners**

- Was the grade level and number of students stated?
- Were the general characteristics of the audience discussed?
- Were student entry skills described?
- Were implications of the audience characteristics and entry skills discussed?

### **Expected Outcomes and Purpose**

- Was a topic, theme, and central concept for the lesson discussed?
- Was the purpose of the lesson clear?
- Was a web, outline, or other visual overview provided?
- Were the concepts and generalizations addressed in the lesson clear?
- Was at least one objective stated?
- Was each objective measurable and observable?
- Was each objective stated in ABCD format?

### **Lesson Resources and Materials**

- Were teacher and student resources discussed?
- Was a description and intended use provided for each resource?
- Were the supplies needed in the lesson listed and described?

### **Teaching/Learning Strategies**

- Was the learning environment described?
- Was the classroom setting described?
- Were springboard activities used to gain student attention?
- Were springboard activities used to inform the learner of the objective?
- Were springboard activities used to recall prior knowledge and skills?
- Was information provided in a logical sequence?
- Was information provided in small chunks?
- Were the format and channels of information appropriate for the content?
- Were students actively involved with the information?
- Were opportunities provided for practice with feedback?
- Did the active involvement match the outcome desired?
- Did the closure activity bring together the elements of the lesson?
- Did the transition activity assist in transfer or preparation for the next lesson?
- Were remedial and enrichment activities discussed?
- Did the plan address the multiple intelligences of the learners?

### **Connection to Outcomes**

- Was student work collected or evaluated?
- Were specific ideas for recording assessment results discussed?

## Creating a Lesson Plan