5

Creativity and Innovation

Cultivating Innovative Ideas and Action

Innovative ideas come from a slow hunch, sudden insight, or pure chance (Johnson, 2010). Sometimes one idea mingles with another idea to form a hunch, and it turns into something new. Innovation can come from collaborating with others (Sawyer, 2006a; Wagner, 2012) or from having the time to explore one's thoughts alone. Inspiration can come from everyday sources, passions and interests, or the unconscious mind. Many innovations are the result of solving problems, making improvements, and real-life investigation; others combine existing innovations. Wagner (2012) interviewed innovators and found a commonality: they all visualized their ideas and mentally figured out what they needed to do to achieve their goals.

According to Govindarajan (2010), innovation prevents creativity from growing stale. Although creative thinkers produce worthwhile ideas, some believe they will not be useful to society if they cannot take action on their ideas. Our creativity enables us

to come up with great ideas; our innovation enables us to execute them. Robinson described it thus: "Innovation is applied creativity" (2011, Chapter 6).

Imagination, creativity, and innovation are interrelated. Imagination sparks innovation. Creativity helps us to produce ideas. Innovation allows us to both generate and apply creative ideas in a given context. According to Robinson, "Innovation is the process of putting original ideas into practice" (2011, Chapter 9).

Promoting Innovation in the Creative Classroom

Innovation in the classroom often occurs as part of a problem-based unit. Students identify problems or challenges based on a given scenario, conduct investigations, and develop an innovative solution. This is the nature of innovation: it serves a purpose, responds to an identified need, and provides a solution. To support students' practice in this area of creativity, ask guiding questions such as the following:

- What is the need? What is the problem or challenge in this situation?
- What is different? Is your innovation worth pursuing? How is your work or idea different from other work or ideas that have been tried or done before?
- What is the solution? How and why do you think your idea is the solution to a problem?
- What is problematic? What problems might surface as a result of your innovation and how will you address them?

Another way to support students' understanding of innovation is to specifically identify the steps in the innovative process. For example, a high school physics teacher introduced the innovative process by showing students the procedural process in Figure 5.1 (Creativity Road 3). The students practiced using the

process after watching the movie *The Social Network* (Fincher & Sorkin, 2010). The movie describes how Mark Zuckerberg created Facebook, an innovative idea using technology. Students paid special attention to the way Zuckerberg moved his innovative idea from a thought to a valuable product. After students viewed the movie, they used the statements in Figure 5.1 to analyze the process and procedures Zuckerberg used to create Facebook. Sample lessons such as this one help drive understanding about the innovative process. The class discussion focused on Zuckerberg's actions and the element of risk: was he being financially reckless, and, if so, when? This led to the question "Why not stop?" The resulting message that the students took away is this: "Think big."

To help students understand what it takes for a creative idea to become something real, teachers model the innovative process. The more students talk about innovation, analyze others' innovations, and discuss the process, the more comfortable they will be actually using the process to engage in innovation.

Innovation begins with inquiry and ends in action. Students need to be able to generate their own questions or ideas to direct their search for answers and solutions. Students who are adept at creative brainstorming and questioning—that is, those who are fluent in their ability to think of possibilities and generate meaningful questions in their pursuit of knowledge—are able to think of many varied questions to drive inquiry. Students who do not have fluent and flexible creative thinking skills often want to jump right in to innovate without doing the legwork. Figure 5.1's stages can be used to delineate a process and provide a structure that helps students think logically and deeply when analyzing the innovations of others developing their own. Figure 5.1 shows how the teacher used some of the elements of each stage, but not all. Teachers should use whatever elements apply to the lesson. As with other areas of creativity, some students may need additional structure and scaffolding, particularly as regards self-regulation and organizational skills, as they embark on this endeavor.

FIGURE 5.1

The Innovative Process

Stage	Example	Student Response
Brainstorm • Sources of inspiration • Needs based on problems/situations	According to the movie *The Social Network* (2010), where did the idea for Facebook come from?	Mark's idea was based on the other men's social media creation, Harvard FaceMash.
Evaluate • Ideas • Sources of inspiration • Needs based on problems/situations	1. Why did Mark decide to move forward with Facebook? 2. Why did he decide to expand his idea beyond the university community?	1. He wanted to impress the girl. 2. He was driven by a broken heart. The woman wasn't aware of Facebook, so he decided to make its presence bigger.
Identify steps to produce the innovation	What were the steps Mark took to move Facebook from an idea to a huge, successful web presence?	1. He created the website. 2. He moved to California. 3. He made the website global.
Identify the enablers and disablers • People • Situations • Resources	Who enabled Mark's success?	His friend Sean Parker.
	Who presented challenges to Mark's Facebook effort?	The men who created the social media site at Harvard.
Reflect • Endpoint • Degree of effectiveness	How did Mark know when he completed his innovation?	The woman noticed him when Facebook became popular. But his innovation doesn't really have an end-point because Facebook is still expanding and changing.

Teachers in the creative classroom can encourage innovation in several other ways:

- *Give students physical space to innovate.* Create a "think tank" area in the classroom where students can either go individually or gather to explore and exchange ideas.
- *Make innovation intentional.* Frame the goal so that the desired outcome is absolutely clear. Incorporating innovation

into students' daily lives—for example, asking them to identify innovative solutions to the problem of a noisy classroom—makes the process of innovation concrete and shows students its real-life application.

- *Give students time to ponder.* Innovative ideas need time to surface. Major companies that we think of as innovative (e.g., Google, 3M) incorporate "free time" within the workday; this time off allows "employees to explore and the freedom to be creative, which can improve morale and increase work output" (Baldwin, 2012, p. 1). Consider the intentional use of unstructured time; unless there is an immediate need to solve a problem, give students time to think.

- *Let students decide what and how to measure success.* For some students, the challenge is working with an idea that causes the greatest positive impact rather than an idea that they like best. Engage students in determining what is measurable and what results are meaningful. How will they determine to what degree their results are effective?

- *Recognize students for their effort as well as their success.* Continuous reinforcement of effort can help keep students engaged, and will help build students' innovative skills. Recognition, however, must be specific in order to be effective. Smiley faces on a sticky note are only effective if students know what they did to make the teacher smile.

There is a school of thought that believes creativity is social; Sawyer (2006a) noted that "the most important creative insights typically emerge from collaborative teams and creative circles" (p. 42). If we translate this information to a school setting, then teachers should organize collaborative teams of students to tap into the innovation process throughout a project cycle.

It may be effective to teach students to work together and use an improvisational approach (Sawyer, 2006b), spinning off of each other's ideas, with each student inspiring the others to

think of new or improved ideas. "Disciplined improvisation leads to deeper understanding than rote learning" (Bransford, Brown, & Cocking, 2000, as cited in Sawyer, 2006a, p. 44). Facilitating collaboration among students means guiding students so that they collaboratively, socially derive meaning from content.

For students to be able to work together effectively and take the leaps of faith required for innovative thinking, they need to be in an environment that is accepting of creativity and risk taking. Students need to feel that it is okay to make mistakes, and that mistakes are necessary on the road to innovation. As with other creative thinking skills, teachers can help students become metacognitively aware of the innovative process. Establishing meaningful definitions and creating shared language surrounding innovation will help students understand the process as well as the importance of innovation and innovative thinking. The shared language promotes innovative thinking by using language that innovators use.

Attending to Executive Function Skills

Executive function skills are key to students' building the "cognitive capacity necessary for school success" (Molfese et al., 2010, as cited in Jensen, 2013, p. 58). To successfully engage in innovation, students need day-to-day executive function skills such as self-control, processing, attention, and memory capacity and sequencing.

When students have issues with **self-control,** they want to jump to a right/wrong conclusion, often one that seems familiar. Innovation is a process, however, that requires self-control with and between the stages in the innovative process. It may help students to follow a step-by-step process, such as in Figure 5.1, to help them stay on task and resist impulsivity.

Another executive function skill area that can present a challenge to students is maintaining **attention and focus.** When

we become frustrated by students' lack of attention, we must remember that students usually *are* focused; they just are not focused on what we want them to be. Teachers can boost students' attention and focus by asking them to make a prediction. The process of prediction engages the brain; as Snyder (2013) described, "If the prediction is correct, dopamine reinforces the effort to try again. When it's wrong, the brain wants to try again to get that mental rush" (p. 1). So including prediction in an exercise helps students stay focused—they will want to find out if they are right.

DiSalvo (2011, Chapter 4) observed that "most of us are mentally elsewhere between 30 and 50 percent of our waking hours," and surmised that spacing out serves an important adaptive function: during this time our brains are digesting data. He also added, "Research points to a strong link between mind wandering and creativity" (Chapter 4). This is a benefit to creative thinking (if, that is, students can control their daydreaming). Teachers should not assume that students are not paying attention, listening, or processing information when they daydream. The challenge, though, is determining whether the student spacing out is thinking of nothing, thinking of something other than what the class is discussing, or reflecting longer on whatever the class is discussing. Rather than assume that the daydreaming is a focus and attention problem, teachers should simply ask students what they are thinking about.

Executive function affects **working memory**, which is "a greater predictor of academic success… than IQ" (Alloway & Alloway, 2010, as cited in Jensen, 2013, p. 67). It is nearly impossible for students to be creative about the content if they do not know or cannot remember content. Some techniques and strategies that can help students remember include creative activities, avoiding informational overload, helping students categorize information, utilizing graphic organizers, providing multisensory stimulation, and designing experiential, real-life learning lessons.

One skill that plays an important role in the innovative process is the ability to follow steps in a process. In order to sequence the innovative task, students must be able to **prioritize and organize** information. They need to know what to do when, and in what order. This skill is teachable when the teacher guides and coaches students by using strategies such as

- a graphic organizer that helps students know when to do what, and what is needed at each step;
- modeling the process to accomplish the task;
- reducing the number of steps for accomplishing the task; and
- having students practice the prioritize-and-organize process by arranging the tasks in order.

Utilizing Strategies to Encourage Innovative Thinking

When introducing students to the concept of innovation, teachers can hook students' interest by discussing the U.S. Patent Office and its role in recognizing true innovation. A brief discussion about the Patent Office can help students understand that some ideas fail, or simply are not innovative enough. Many innovations, however, are successful and do end up as products or ideas that make a difference (about 60% of ideas submitted for patent approval are approved). Introducing the idea of the formal patent approval process reinforces student understanding of innovation as a response to a need or problem. This approach can be used in different content areas to springboard students' exploration of the innovative process:

- Students studying World War II look at innovations that received patents during that time. Which ones had to do with a response to the needs of the war? Why was innovation important during that timeframe?

- In a unit focusing on water conservation, students explore the history of bathtubs and showers along with attendant water consumption data. They identify innovative ways that bathing has improved over time and determine whether patents were issued for these innovations.
- Students studying fossil fuels work in collaborative groups to identify a specific problem that exists and come up with an innovation to address the problem. They research whether their innovation already exists, and if so, if there is a patent for the innovation.

After students explore the relationship between innovation and patents, they are ready to apply the innovation process in Figure 5.1 to the content they are studying. Figure 5.2 provides examples of innovation activities across content areas.

FIGURE 5.2

Innovation Activities Across Content Areas			
Literacy	**Math**	**Science**	**Social Studies**
• Create an innovation that would improve a character's life. • Create an innovative way to improve communication between two characters. • Develop an innovative way to solve the problem in the story. • Suggest an innovative way for the main character to take a risk.	• Determine an innovative way to remember math facts. • Design an innovative system of measurement. • Create an innovative way to demonstrate parallel operations using scale and manipulatives. • Determine an innovative way to demonstrate place value.	• Identify an innovative way to reduce pollution. • Develop an innovative way to continue space exploration. • Determine an innovative solution to compensate for the loss of a sense. • Create an innovative space object using at least two characteristics.	• Create an innovative solution to a problem in our community. • Describe an innovative solution to the concept of scarcity. • Create an innovative way to celebrate a national holiday. • Develop an innovative form of transportation that will be beneficial to society.

Innovation in the creative classroom can take many forms. For example, a 5th grade teacher presenting a unit on the Westward Movement asks students to come up with an innovative way to improve a Conestoga wagon and actually make their new and improved wagon. This assignment requires students to research how the wagons were used, determine what the needs were at that time, and respond to a need. Groups of students use the innovative process to come up with the innovation and move it forward to something they can actually create. They work together to apply math and the scientific principles of movement and mechanisms to create their modified wagon. If time does not permit, students do not have to actually physically create an innovation; simply analyzing their idea for an innovation using the steps in Figure 5.1 contributes to their understanding of this aspect of creativity.

This process of innovation can be explicitly taught:

1. *Brainstorm* possible needs or problems and ways to respond.
2. *Evaluate* ideas to decide which idea is most worth pursuing.
3. *Identify steps* in the process to produce the modification or improvement.
4. *Identify enablers and disablers* of the idea.
5. *Reflect on the results* of the innovation in order to determine if it is complete or needs to be modified.

Targeting Innovation Within Creative, Standards-Based Activities

As with other areas of creative thinking, innovation can help students gain a deeper understanding of content. To be able to come up with an innovative solution to a problem, students must know and understand the problem described in the text and the topic or concept of the problem. This knowledge is reinforced when the teacher requires students to reference where the text indicates

a need, to cite sources identifying a challenge or problem, or to describe the principle underlying a proposed solution. The process of innovation is strengthened for students if the assignment also requires them to explain their thinking throughout.

Figure 5.3 revisits the academic content standards I presented in previous chapters. This time, we are looking at connecting the standard with an activity that targets students' skills in innovation.

In order for any lesson targeting innovation to be successful, students need to stretch their thinking. They may be inclined to resort to their first idea; teachers remind students that the goal is to identify an innovative response to a problem or situation. *Innovation* means to implement ideas to make them a reality or to add value to something. For example, 8th grade math students worked together in groups on the assignment described in Figure 5.3. In choosing what objects to use to represent variables, they considered what might make their demonstration innovative. One group chose cows and chickens as their variables and equated them with packages of meat at the grocery store. They created a graph and showed the relationships. The students succeeded in the assignment: not only did they demonstrate their understanding of the content, but they also chose a very innovative way to demonstrate qualities and quantities.

Designing Lessons to Target Creativity and Innovation

Figure 5.4 illustrates how to design a lesson to target creative thinking and innovation. This teacher is introducing a new unit that addresses the CCSS for interpreting informational texts and for speaking and listening, as well as the standard for evaluating or refining a technological solution that reduces impacts of human activities in natural systems. The teacher asks students to develop an innovative way to reverse the "greenhouse effect" so that it no longer worsens over time. For this lesson (which incorporates

FIGURE 5.3

Targeting Innovation Within Creative, Standards-Based Activities

CCSS Key Ideas and Details	Creative Activity Targeting Innovative Thinking
Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (RL.3.1) Text: *Sarah, Plain and Tall* (MacLachlan, 1985)	Students develop a written description of a contextually appropriate innovation in response to the following prompt: *In the story* Sarah, Plain and Tall, *the Wittings live a simple life. Identify a need in the story that a character has and create an innovative tool to address the need.*
Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (RL.5.1) Text: "Fog" (Sandburg, 1916)	Students develop a diagram or drawing and written description of an innovation that controls fog. The description includes references to the text that demonstrate how the innovation controls the different elements of fog described in the poem.
Use place value understanding to round decimals to any place. (5.NBT)	Students create an innovative design that teaches someone else the relationship between place value and decimals. They also describe their thinking through the five steps of the innovation process.
Create equations that describe numbers or relationships: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (HSA-CED.A.2)	Students use two or more objects that represent variables and come up with an innovative way to demonstrate the relationship between quantities. Their demonstration must include a description of their thinking through the five steps of the innovation process. They graph equations on coordinate axes with labels and scales.
Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain. (RL.12.1) Text: Keats's "Ode on a Grecian Urn": "Beauty is truth, truth beauty,—that is all / Ye know on earth, and all ye need to know."	The urn in "Ode on a Grecian Urn" can be seen as an innovative idea. Students use the innovation process to analyze how the inspirational qualities of the urn resonated with Keats.

Note. CCSS = Common Core State Standards (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010a, 2010b).

FIGURE 5.4

Designing a Lesson: Targeting Creativity and Innovation

Identify Content, Topics, Subtopics, Skills, Concepts	CCSS	Topics:	Subtopics:	Skills:
	• RI.9-10.1 • RI.9-10.2 • HS-ES53-4	• Sun's effect on climate • Factors that affect climate • Worldwide climate patterns	• Greenhouse effect • Rotation, revolution • Latitude • Ocean currents • Wind patterns • Landforms • El Niño	• Critical thinking • Cause and effect • Creative thinking: innovation and fluency • Descriptive writing/wording

Essential Question	How do human decisions affect climate?		
Assessment	Summative: rubric		

Differentiation	Ability	Interest	Cognitive style
	Reading: different reading levels	No differentiation	Record responses

"Hook" Student Interest	Teacher lists yearly temperatures and precipitation of five unnamed U.S. cities. Students guess what cities they are and give reasons for their choices.		

Lesson Set-Up	Teacher reviews/extends *content*:	Teacher reviews the *thinking process*:	Teacher reviews the *product form*:
	The teacher reviews with students how westerly winds affect weather. Students orally compare weather in cities with the same latitude and discuss what would happen to the three latitude zones if Earth tilted at 66 2/3°.	The teacher reminds students of a previous lesson where they demonstrated creative and innovative thinking. Class reviews the five-step innovation process to guide their work. Students understand that the assignment requires innovative thinking and identifying an innovative solution.	The product form will be the innovation process paper where students record their ideas. The teacher reviews the rubric to ensure students understand how they will be assessed. Class reviews the rubric, and teacher clarifies any confusion or misunderstanding. The teacher describes the talk show format.

FIGURE 5.4 — (*continued*)

Designing a Lesson: Targeting Creativity and Innovation

The Activity	Introduction:	Procedures:
	The teacher tells students they will use their imagination and their factual knowledge to think of an innovative way to reverse the pattern causing the greenhouse effect.	After conducting research, student groups brainstorm reasons why the greenhouse effect is getting worse and ideas that might respond to each potential explanation.
	Groups of students explore two websites with information on the greenhouse effect and ideas or recommendations that have already been tried or implemented to try to minimize the effect. The teacher provides sites with easier reading levels for students who struggle in reading.	Students generate group criteria and individually evaluate the ideas using the "eliminate and defend" strategy to help them make a logical decision. Students independently conceptualize an innovation, write or record the steps required to make the innovation happen, and surmise who will support them and who will likely put up roadblocks. They imagine their innovation coming to fruition and present their possible results and any ideas for improvements to the class in a talk show format.
Assessment	The teacher assesses the innovation process by marking the rubric and makes specific comments to elaborate on feedback.	

innovative thinking), students must be able work collaboratively in groups; they also need to know what the greenhouse effect is, what causes it, its effects, and steps that have already been taken to reduce these effects.

When introducing this lesson, the teacher highlights the focus on innovation so that students will pay attention to it, and models the innovative process by showing them examples from a prior lesson that generated student innovations. The teacher also shares examples from real life to illustrate how someone takes an idea and turns it into an innovative idea or an innovation. The teacher explains that students will use the five-step innovative process to develop their innovations. Students work together to collect and share facts and to brainstorm ideas. (As previously noted, by working in a group, students will come up with more ideas than they would on their own.) The teacher makes sure the groups are heterogeneously mixed and that the student's personalities complement each other. In the second stage of the process, when students evaluate ideas, they work together to generate criteria using the Eliminate and Defend strategy (see "Grab and Go" Idea #33). Then they work on their own to decide on the one idea that they think is best. Each student conceptualizes their chosen idea and determines the steps needed to complete the innovation. They anticipate who could help them with their innovation and who might be the naysayers. The final stage in this activity is a "talk show" (based on "Grab and Go" Idea #35) where students ask and answer questions about each other's innovation. In addition to discussing their idea with a partner, students write their responses to the questions.

The rubric for this assignment (see Figure 5.5) provides guidance to students and also a basis for teacher feedback for group and individual work. The rubric incorporates expected levels of creative thinking (fluency) and innovation. The teacher includes a self-assessment component because she wants students to understand how important it is for them to learn from

FIGURE 5.5

Sample Rubric for Lesson Targeting Creativity and Innovation

Assignment Element	Not So Hot	Okay	Very Good	Great
		Group Assessment		
Brainstorm: Earth-sun relationships Rotation Revolution Greenhouse effect	Few facts Little or no evidence of research Facts only Little detail	Some facts Some evidence of research Facts with few additional imagined details Some detail	Many facts Evidence of research Facts combined with one or two original ideas Many details	Many facts Evidence of extensive research Facts combined with many original, logical ideas that enhance the scenario
Brainstorm solutions to the effects	One effect One solution	Two effects One or two solutions for one or two effects	Three effects Two solutions for each effect	More than three effects Three or more solutions for each effect
		Individual Assessment		
Decision	No criteria applied in making decision	Obvious criteria applied in making decision	Most criteria applied in making decision	All criteria applied in making decision
Plan	Steps do not represent the innovation process Enablers and disablers incorrect or not listed	Some steps missing Obvious enablers and disablers listed	Steps are sequenced correctly with basic descriptions and make sense List of enablers and disablers makes sense and represents realistic ideas	Steps are sequenced correctly and are very descriptive and logical List of enablers and disablers makes sense and represents deep thinking
"Talk show" responses (written)	Some responses missing Some ideas not relevant	Responses are minimal Some ideas logical but not significant	Responses are complete Ideas are relevant and logical	Well-developed responses include specific details, thoughtful generalizations, and conclusions

their own self-evaluation and not solely rely on someone else's opinion of their work.

Providing students with feedback helps them become more effective innovative thinkers (see discussion in Chapter 7). When providing feedback, recognize students for the strengths they demonstrate within the innovation process and provide strategies and tips on how to improve in areas in which they are weak. The feedback is not about whether the student is a "good" innovative thinker, but rather how well students use fluent, flexible, original, and elaborative thinking in the different stages of the innovative process. Feedback should also address effort and how well students use critical thinking in order to converge their ideas.

Figure 5.6 sums up the tips for creating a classroom community that embraces an innovation mindset. The five different ways to promote an innovation mindset lay the foundation necessary for students to understand what innovation really is.

The more that students engage in innovation activities in school, the more they will begin to really understand innovation and the importance of it. Innovation does not apply to everything; there is a time and a place to innovate. When students use the innovative process, they learn the importance of developing a plan for implementation and how to direct their actions. Students will think of themselves as innovators if you ask them if they used innovative thinking today. Remind them that we evaluate the effects of our innovation because we value it.

The four "grab and go" strategies at the end of this chapter target the five steps of the innovative process. Within each step, students use one or more of their creative thinking skills (i.e., fluency, flexibility, originality, elaboration). They use divergent thinking when generating or considering more than one idea, and they use convergent thinking to decide upon the best idea. The actual innovative process as it is described in this chapter is procedural and can be found on Creativity Road 3. The "grab and go" strategies that are used in the different steps in the process are often found on Creativity Road 2.

FIGURE 5.6

Supporting Innovative Thinking: Tips for Success	
Tip	**How to Get There**
Build an innovative mindset	Provide a context Create an innovative climate Foster creativity Involve students in shared learning Measure success
Understand innovation	Have a common definition for teacher and students Put ideas into practice Understand the importance and relevance of innovation Know where to innovate
Plan for innovation	Model the process Identify who does what, when
Make innovation happen	Find ideas Analyze options Choose an idea Implement the ideas Manage the process Review results Share ideas

Reflecting on and Extending Chapter Information

1. Practically speaking, do you agree that using the innovation process can help students achieve the Common Core State Standards (or your individual state standards) in your content area? Elaborate.

2. Is there a place for innovation in our schools? Why or why not?

3. Do you think innovation needs to be differentiated for young students? Explain.

4. Describe how you would manage the class while they were engaged in an innovation lesson.

5. How would you compare lessons that emphasize creativity, imagination, and innovation to those that focus more on critical thinking?

"Grab and Go" Idea #32
Nervous Nellie

The Nervous Nellie strategy (Creativity Road 2) promotes innovative thinking by having groups of students generate many different worries about a situation—and then generate many different ways to resolve these problems. It is designed to support students in the first step of the process of innovation (i.e., identify the need) and incorporates divergent thinking, fluency, and flexibility.

For example, 5th grade students studying western migration are told to place themselves in the role of Nervous Nellie, who is worried about going on the Conestoga wagon. Groups of students generate a list of Nellie's worries and categorize them by type of concern (see Figure 5.7). In this lesson, the first worry students identify is that it is dangerous. The category of concern that this worry falls into is safety.

The next step is for the team to identify the greatest need generated from the Nervous Nellie categories. Students tend to count the number of ideas listed in a category and mistakenly think the category that has the most ideas must represent the greatest need. This is the time to remind students to use flexible thinking. After identifying the different categories, students

1. Write all the categories on different index cards, mix them up, and place them face down on the table.

2. Choose someone from their group to record responses.

3. "Roll and respond": The recorder turns over a category card face up and rolls the dice. The student who has the number

on the dice must come up with an idea that will solve the worry category identified on the card.

4. The student who responded rolls the dice, and the student who has the number on the dice adds a solution or changes the category by flipping over the next card.

5. The recorder writes down all responses.

This process continues until the group has generated multiple different responses to all of Nellie's categories of worries.

FIGURE 5.7

Nervous Nellie: Innovative Thinking Strategy	
Nellie's Worries	**Type of Concern**
It's dangerous.	Safety
There is not enough food.	Food
It is a very long trip.	Time
I don't like the leader.	Leadership
It is the wrong time of year.	Time
My friends are not going.	Companionship
I can't bring my dog.	Companionship
I am not comfortable.	Physical comfort
I can't get up on and down off the wagon.	Physical ability
I don't get along with some of the people.	Socialization

"Grab and Go" Idea #33
Eliminate and Defend

This Creativity Road 2 strategy helps students identify and choose their best idea (the second step in the innovative thinking process).

The class as a whole generates criteria to use to guide them in making a logical decision.

Questions that may be used to assess the validity of an innovative idea include the following:

- Is it practical?
- Is it appropriate (to the context, content, or topic)?
- Is it effective? Will it work?
- Is it long lasting?
- Is it reasonable? Is there time and are there materials?
- Is it innovative?

Based on the agreed-upon criteria, students, as a whole group, as a small group, or individually, compare two ideas at a time to eliminate the weaker idea. For each idea, they should identify which of the criteria is met or not met. Then, through a process of elimination (i.e., the stronger idea is compared to the next idea), students identify the final, best solution.

"Grab and Go" Idea #34
Creating Consensus

This Creativity Road 2 strategy asks students to visually develop their innovation. Students work collaboratively to help each other identify steps to move each student's innovation from an idea to full conceptualization. This small-group activity focuses on the third and fourth steps of the innovation process.

The activity begins with students folding a sheet of paper into eight squares. They draw one picture of what their innovation looks like in the first square. Each student shows his or her drawing to the group and explains it. At this point, other students in the group can ask questions about the innovation. After the discussion, the student writes in the second box what needs to be done

first in order to make this innovation happen. Then the student passes the paper to the next student, who writes in the next box what should happen second. The students pass the papers around the table until the innovation process is complete. They can use the back side of the paper if they need extra space. If you are doing this with young students, you might want your students to fold the paper in fourths and list only four steps.

When students receive their papers back, they circle any ideas they had not thought of. Each student finalizes the steps to produce his or her own innovation and present it to the group. They include who can assist with the innovation and who might resist it. Then, as a group, they discuss the best ideas in order to form a consensual innovation solution. When students feel they have addressed all potential challenges, they are ready to submit their innovation and the innovation process to the teacher.

"Grab and Go" Idea #35
Talk Show

This Creativity Road 2 strategy allows students to self-assess their innovation and addresses the final stage in the innovative process. Students work in pairs; one student is the talk show "host," who will ask preset questions regarding the student's innovation, and the other student is the "guest." The host does not know what the guest's answers will be. The host is allowed to ask the guest to elaborate or clarify. All students review the questions ahead of time and write their responses; they can refer to this work during the talk show but should not simply read them aloud. Examples of questions include the following:

1. What was the purpose of this assignment?
2. How did your innovative idea meet the purpose of the assignment?

3. What did you learn from using the innovative process?

4. By doing this project, did you learn any strategies to improve your thinking and learning? If so, what were they, and how do they apply to innovation?

5. What did you learn about yourself as a team member? Be specific and give examples.

6. If you could change anything about this assignment, what would it be and why?

7. Do you have anything else you would like to add?

Pairs of students trade places and repeat the process. When the interviews are complete, students turn in their responses to the teacher. Students reflect on their own learning using the assignment rubric. The class should also discuss the assignment as a whole, sharing what they learned and their responses to the questions.

Teachers can expand upon this idea by having students develop content-based questions for each other, by video recording the interviews or performing them in class, by having the "host" ask follow-up questions, or by having the talk show "hosts" also assess their "guests" using the assignment rubric.