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Oral Communication Strategies

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Graphics created by Daniella Sanader

Pair Work: Think/Pair/Share

SCIENCE Grades 9-10

Oral skills – both listening and speaking – are at the very foundation of literacy. In science, students use oral language to describe, share or present experimental results, the impact of science on society and the environment, and courses of practical action. Students must be provided with ample opportunities to talk about science before, during and after doing science. Topic-focused oral communication promotes students' understanding of concepts and skills, and enhances their understanding of the connections among science, technology, society and environment.

Purpose

- Provide cooperative learning opportunities for students to think individually about a question or a topic, and then refine their understanding through listening, sharing, and discussion with a partner.

Payoff

Students will:

- reflect on a topic under discussion.
- identify key ideas and concepts.
- deepen understanding of the topic through exchange of ideas with a partner.
- develop skills for discussion, such as listening actively, expressing ideas with confidence, rephrasing ideas for clarity and disagreeing respectfully.

Tips and Resources

- The success and quality of the Think/Pair/Share strategy depends on the quality of the question or topic posed.
- Topics for discussion can be a concept, a hypothesis, an experimental or design procedure, facts for comparison or contrast, an issue, in-class reading or ideas for a science fair. See Teacher Resource, *Discussion Prompts for Think/Pair/Share.*
- Review and model the skills that students need to participate effectively, such as good listening, turn-taking, respectful consideration of different points of view, asking for clarification and rephrasing ideas.
- Use this strategy at any point during a lesson, for very brief intervals or for a longer time frame.
- Increase the amount of time devoted to this strategy, depending on the complexity of the question or topic being considered.
- After students share in pairs, consider switching partners and continuing the exchange of ideas.
- Think/Pair/Share can be followed up by individual journal entries.
- Think/Pair/Share can be integrated into many reading strategies, such as an ***Anticipation Guide***, ***Most/Least Important Idea(s) and Information***, and ***Drawing Conclusions***.

Think Literacy: Cross-Curricular Approaches Grades 7-12, pp.20-23, 44-47, 70-73.

Further Support

- Some students may benefit from a discussion with the teacher to articulate their ideas before moving on to share with a partner.

Pair Work: Think/Pair/Share

SCIENCE Grades 9-10

What teachers do	What students do
Before • Prepare a topic, question, prompt or have students read a selection for a planned Think/Pair/Share activity. OR • Choose a "teachable moment" during the class when the process of reflection and shared discussion would bring deeper understanding, and insert a brief *Think/Pair/Share* activity into the lesson at that point. In either case: • Consider the social and academic or inquiry goals for the *Think/Pair/Share* activity, and plan for pairing of particular learners that would further those goals.	• Read the section or chapter, if the *Think/Pair/Share* is based on information from a reading selection. • Think about ways the reading selection may be interpreted and justify their own interpretation.
During • Set clear expectations regarding the focus of thinking and sharing to be done. • Ask students to spend several minutes thinking about and writing down ideas. • Put students in pairs to share and clarify their ideas and understanding. • Monitor students' oral language and listening skills by circulating and listening.	• Formulate thoughts and ideas, writing them down as necessary to prepare for sharing with a partner. • Ask partner, "What did your hear?" after sharing ideas. • Ask partner for help if unable to paraphrase ideas heard.
After • Call upon some pairs to share their learning and ideas with the whole class. • Possibly extend the *Think/Pair/Share* with a further partner trade, where students swap partners and exchange ideas again. • Consider adding a journal writing activity as a productive follow-up to the *Think/Pair/Share* activity.	• Pinpoint any information that is still unclear after the pair discussion, and ask the class and the teacher for clarification.

Notes

Pair Work: Think/Pair/Share

SCIENCE Grades 9-10

Discussion Prompts for Think/Pair/Share

To activate prior knowledge

- What are the parts of a cell?
- How do plant and animal cells differ?
- How do pure substances differ from mixtures?
- What are the differences between physical and chemical changes?

To uncover misconceptions

- Water boils at 100^{o} C.
- Chemical changes are not reversible.
- Speed and velocity are interchangeable terms.
- Water conducts electricity.
- Mitosis and the cell cycle are the same thing.

To formulate hypotheses

- State a hypothesis for how increasing surface area affects the rate of a reaction.
- State a hypothesis for how changes in soil pH affect plant growth.

To design an inquiry

- Design an investigation to examine the effects of altering soil pH on the rate of plant growth.
- Design an investigation to measure acceleration due to gravity.

To review concepts

- How do the terrestrial and Jovian planets differ?
- Describe the nitrogen cycle.
- Describe and explain how heat transfer occurs within the water cycle.
- How does the hydrosphere act as a heat sink?

To examine an issue

- What is the best method of generating electricity at a cottage in a remote location?
- Should the government provide discounts for people who purchase hybrid cars?

Pair Work: Timed Retell

SCIENCE Grades 9-10

In pairs, students practise their listening and speaking skills. Students divide into pairs and take turns speaking, listening, and retelling information in timed steps.

This strategy can be used in many different ways. It can be used as a way for students to consolidate their understanding when reading about a topic. It can also be used to review class material and help students develop their study skills, and to practice new vocabulary terms for any science unit.

Purpose

- Enhance critical thinking skills.
- Make connections between written and oral skills.
- Briefly consolidate or reinforce learning.

Payoff

Students will:

- develop a strategy that can be used to learn and review content material in science.
- share ideas.
- develop listening skills.
- share responsibility for reviewing with each other.
- develop note-taking skills.
- "talk" their way into meaning and understanding through verbal rehearsal.

Tips and Resources

- Use this review and share strategy on a regular basis to reinforce the learning of science vocabulary.
- Students may make notes during the presentations given by their partners.
- Students need to be given enough time to prepare their presentations if they are teaching new subject matter so that they have a chance to check their understanding with you.
- This strategy is an excellent training tool if you are trying to get your students ready to try a more complex strategy such as JIGSAW (*Think Literacy: Cross-Curricular Approaches Grades 7-12*, pp. 170-171).

Further Support

- As always, consider pairs carefully. Personality types and skill level are important factors in determining which students are paired together.

Pair Work: Timed Retell

SCIENCE Grades 9-10

What teachers do	What students do
Before • Choose a relevant question or issue that might invite debate. • Make sure that students have the appropriate background knowledge on the issue.	• Individually read and jot down some point form notes on the topic, if required.
During • Put students in pairs, facing each other. • Direct all partner 'A' students to begin by speaking on the "for" side of the issue. • Partner 'A' will talk for one minute, while partner 'B' listens. Ask partner 'B' to retell the talk for one minute. • At the end of one minute, ask partner 'B' to present the opposing side of the argument. Direct partner 'A' to then retell partner 'B's' argument.	• Decide who will be partner 'A' and who will be partner 'B'. • Partner 'A' speaks for one minute, convincing partner 'B' as much as possible. • Partner 'B' listens carefully and retells partner 'A's" argument. • Partner 'B' wraps up the retell and then gives the opposing argument. • Partner 'A' listens carefully and retells partner 'B's' argument.
After • Invite students to write each other's side of the issue in a paragraph or letter to the editor. • Put students into groups of four. Each group should contain students who all argued from the same point of view in their paragraph. • Ask students to read their paragraphs to the other members of their group. • Organize the class into a circle to discuss the group findings.	• Write a carefully constructed paragraph from the partner's point of view. • Read the paragraph to the partner to ensure that no important details have been omitted. • Peer-edit paragraphs for sentence structure, grammar, and mechanical errors. • Read their paragraph to the other members of the group. • Comment on the points discussed in each reading. • List the common points. • Present the list of common points to the class, ensuring that all group members have a chance to speak.

Notes

Small-group Discussions: Place Mat

SCIENCE Grades 9-10

The *Place Mat* strategy can be used in small or medium sized groups. It allows students the safety of sharing responses with peers prior to sharing answers orally, while still insisting on individual accountability. Essentially each group is given a large sheet of paper that is divided into sections. Each student has his or her own section around the outside and a group section is found in the middle (see Teacher Resource pages for some examples). While engaged in this strategy students first fill in individual sections and then come together to fill in the group section.

This strategy can be as easy or as complex as you choose to make it. It blends easily with other strategies such as a *Plus/Minus/Interesting* strategy (see Teacher Resource*, Sample Place Mat combined with Plus/Minus/Interesting*), *Venn diagram*, or *Think/Pair/Share* as well as with tactics such as *Numbered Heads*.

In science the *Place Mat* strategy can be used to activate prior knowledge and to uncover misconceptions before starting a new strand, for formative assessment after the introduction of a new idea, or as a structured brainstorming activity to develop questions that could be asked during assessment. It can also be used to give students practice with quantitative calculations such as mechanical advantage.

Purpose

- Involve students in active learning.
- Give all students an opportunity to share ideas and learn from one another.

Payoff

Students will:

- have an opportunity to reflect and participate.
- experience social and emotional engagement with their peers while accomplishing the task.

Tips and Resources

The strategy is as flexible as your creativity.
Use the *Place Mat* strategy for a wide range of learning goals, for example:

- Brainstorm ideas about a new topic of study (e.g., causes of cancer).
- Activate students' background knowledge (e.g., What everyday products are acids and bases?).
- Design a controlled investigation (e.g., How does temperature affect reaction rates?).
- Help students practise and share understanding (e.g., solving Ohm's law problems).

Groups of 2-4 are ideal, but this strategy can work with larger groups of up to 7.
You can choose several issues or questions to explore. In the same class, each group can work on a place mat on a different question or issue. The groups will rotate through the various questions until all are completed. You can also combine with the JIGSAW (*Think Literacy: Cross-Curricular Approaches Grades 7-12, pp. 170-171*) if your students are adequately trained.

Further Support

- Give careful consideration to the composition of the small groups, and vary the membership according to the students' styles of learning and interaction, subject-matter proficiency and other characteristics.
- Some students may benefit from being able to "pass" during group sharing.

Small-group Discussions: Place Mat

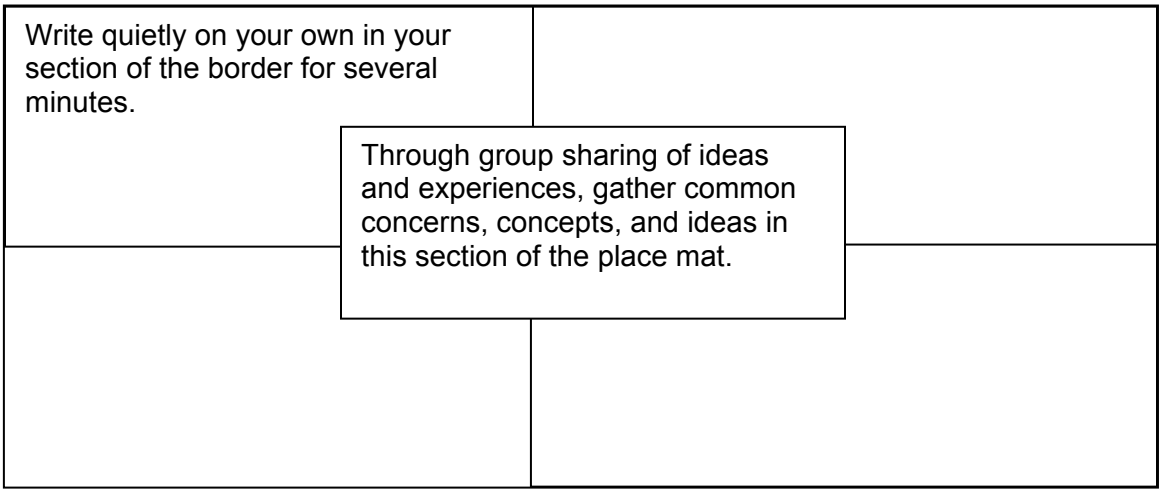
SCIENCE Grades 9-10

What teachers do	What students do
Before • Divide the class into small groups of 4-5. • Decide on a question (or concept or problem). • Distribute chart paper to each group. • Ask students to divide the chart paper into sections equal to the number of students in the group, leaving a square (or oval) in the centre for later recording the group consensus.	• Draw the place mat template according to the number of people in the group. • Put their name in their own section.
During • Direct each group member to think about, and then write silently about a question or topic in their personal area of the chart paper for a determined amount of time. Give students a pre-determined amount of time.	• Gather their thoughts about the chosen question or topic and write silently in their own area of the paper, respecting the space and silence of all members of the group.
After • Assign a recorder for each group. • Have the group come to a consensus about the 3 most important ideas from their notes. • Randomly choose one student to report the group's conclusions. • Collect the charts and give feedback on the group process such as individual accountability and appropriate incorporation of ideas in the group product. OR • Have students post the charts to share their group's thinking with the class.	• Take turns sharing ideas with the group. • Engage in discussion with all group members. • Record common ideas in the centre of the place mat. • Practise active listening, requesting clarification, and coming to consensus.

Notes

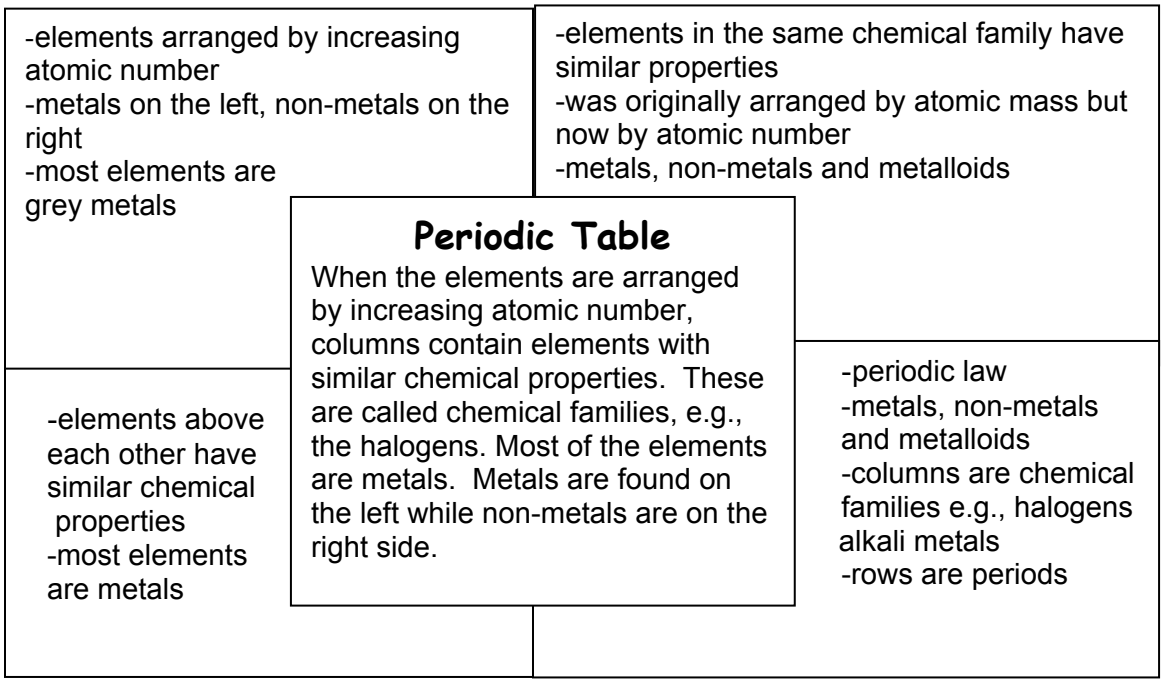
Sample Place Mat

SCIENCE Grades 9-10



Sample:

The Place Mat strategy can be as simple or as complex as you would like to make it. The following is an example of a place mat used to review the organization of the Periodic Table. The students simply fill in their section individually and then compare their responses. They use the individual responses to generate a summary of the key ideas in the centre. Four students were involved in this particular example.

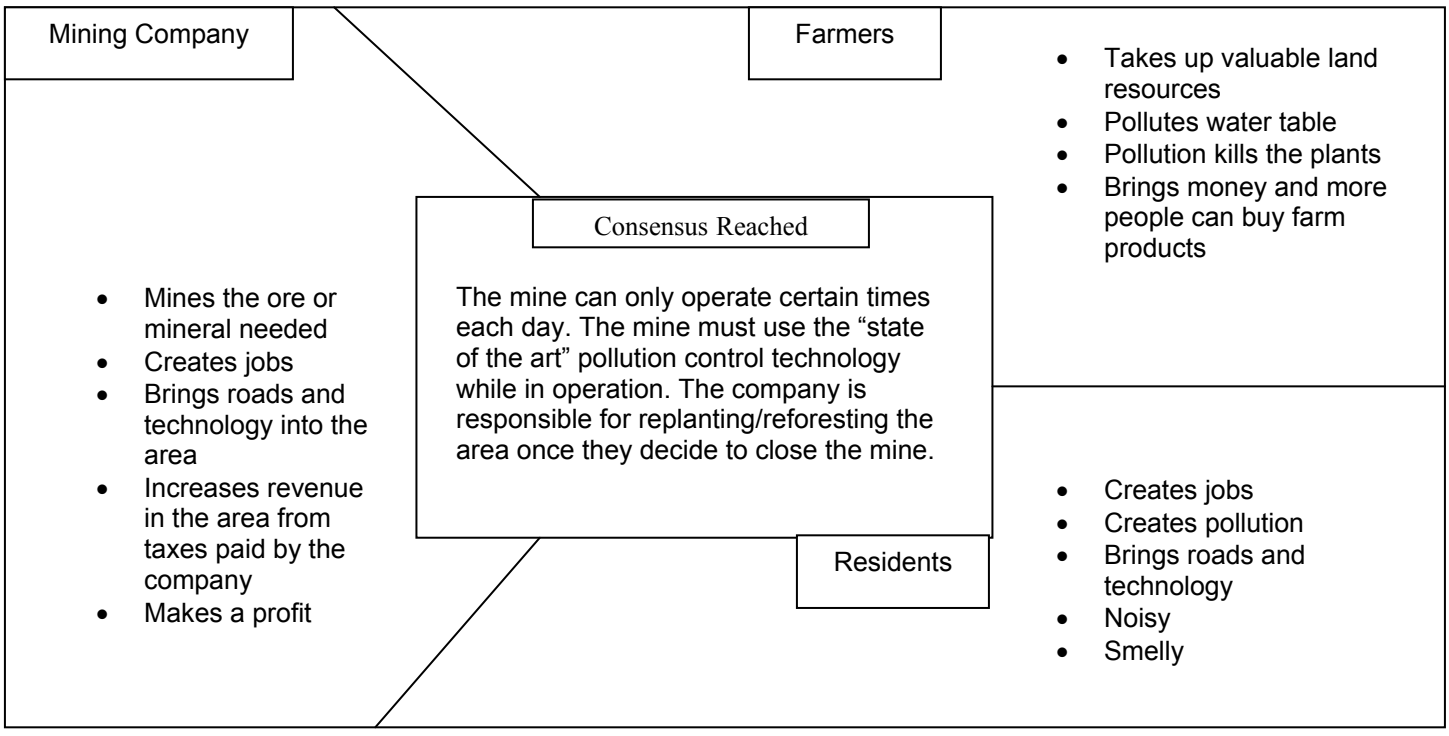


Sample Place Mat
Combined with Organization by Interest Party

SCIENCE Grades 9-10

The Place Mat strategy is useful when the class is preparing to discuss/debate an issue. In the example given below, each student represents a member of a specific special interest group. In this case, the issue is "Should a mine be allowed to operate near our town?" Form groups containing the same number of students as the number of interest groups dealing with an issue. Each student records the information from the perspective of his or her interest group. The students then must come up with a viable consensus (in the centre) for all parties involved. The example below has 3 interest groups and 3 students.

Tip: If some students would benefit from further support, you can have them tear off their section and share it with others from the same interest group (e.g., all farmers together) before returning to their original group to come to a consensus.



Small-group Discussions: Discussion Web

SCIENCE Grades 9-10

In this strategy, students begin sharing their ideas in pairs, then build to a larger group. The discussion web provides practice in speaking, listening, reading and writing.

Purpose

- Give students the opportunity to use facts and concepts to develop their ideas about opposing sides of an issue and to share them with classmates in a situation that requires critical thinking.

Payoff

Students will:

- be involved in using evidence to examine an issue and to think critically.
- take responsibility for developing and sharing their ideas.
- reflect on their own developing discussion skills.

Tips and Resources

- The *Discussion Web* strategy guides students to think about an issue (e.g., "Should the composting of household organic waste be mandatory?" or "Should patents be granted on living organisms?") and gather evidence on both sides of the issue. It is important to choose an issue that has well-defined positions "for" and "against" a proposition.
- Model the process thoroughly to show how the *Discussion Web* works before having the class engaged in the activity.
- Review the listening and speaking skills for the *Think/Pair/Share* strategy as a pre-requisite for effective participation in the *Discussion Web* activity.
- Prepare a *T-chart* graphic organizer for students to organize their supporting arguments. See Teacher Resource, *Discussion T-chart Example* p. 22.
- See reading strategies, including *Most/Least Important Ideas(s) and Information, Drawing Conclusion (I Read/I Think/Therefore*) and *Making Judgements (Both Sides Now*) in *Think Literacy: Cross-Curricular Approaches Grades 7*-12 p. 44, 70, and 74 for ways to develop the co-requisite critical reading and thinking skills.
- This *Discussion Web* strategy can be extended into a whole-class *Four Corners* discussion in which students move to an area of the room that best represents their stance on an issue - agree, strongly agree, disagree, strongly disagree – and share their ideas.

Think Literacy: Cross-Curricular Approaches Grades 7-12, pp. 44-47, 70-73, 74-78, 182-184.

Further Support

- Some students may need support with note-taking while they read, or clarification about facts, concepts and arguments that support each side of the issue.
- Have students fill out the *Yes/No T-chart* together in pairs.

Small-group Discussions: Discussion Web

SCIENCE Grades 9-10

What teachers do	What students do
Before • Review reading strategies (e.g., *Most/Least Important Idea(s) and Information, Drawing Conclusion* ***(I Read/I Think/Therefore)***) to prepare students for reading a selection on a relevant topic. • Target a particular position or point in the reading selection and explain that students will read the selection and construct support for and against the point or position in the reading (e.g., Should the Non-Essential Use of Pesticides Be Banned? See Teacher Resource.) • Present the discussion web question to the class.	• Read the section chosen by the teacher. • Think about the point made or position stated in the reading selection, and individually try to construct support for both sides of the issue.
During • Explain to students that they will have to develop support for both viewpoints by citing specific reasons. • Allow enough time for students to contemplate and write down reasons for each viewpoint. • Put students in pairs to share their written ideas in a *Think/Pair/Share* activity. • Combine two pairs of students and have them compare their ideas and form a conclusion about which viewpoint to support. • Call on a representative from each group to share the group's conclusion with the class.	• Think about and individually record ideas on both sides of the issue, using a *T-chart* format. • Share ideas with a partner, adding any missing ideas to their own *T-chart*. • Move on to sharing ideas in a group of four, adding any additional points to the *T-chart*; the larger group must then decide which side of the issue to support, based on both the quantity and quality of the arguments on each side. • Reach a conclusion as an entire class about the viability of each position.
After • Reach a conclusion as an entire class about the viability of each position. • Provide time and a framework for students to reflect on the discussion skills they used during the activity, their strengths, and how they can improve.	• Write about their position and reasons for it. • Reflect on the discussion skills they used and how they can improve their participation and effectiveness in small group discussions.

Notes

Small-group Discussions: Discussion Web

SCIENCE Grades 10 (Biology Strand)

Should the Non-Essential Use of Pesticides Be Banned?

In 2001, the Town of Hudson, Quebec, enacted a bylaw that banned the use of lawn pesticides within its jurisdiction. As a result of the ban, home owners could no longer use chemical pesticides to control lawn weeds such as dandelions. Local lawn care companies were furious and challenged the legality of the bylaw in the Supreme Court of Canada.

Have students research both sides of the issue and record their findings in a *T-chart*. Sample student responses are provided below:

Yes	No
It is impossible to confine pesticides to the location where they are applied. Because of seepage into ground water, pesticide use on private property eventually becomes a public concern.	Each home owner has the right to manage their private property.
There are non-chemical methods of controlling weed populations.	A lawn full of weeds is an eyesore. Non-chemical methods cannot control them.
Acceptable levels for specific chemicals are often set for the average adult male. Concentration limits may differ for women, children, and seniors.	It is inappropriate to block the use of pesticides that have been approved for use in Canada by federal and provincial authorities.
Lawn care companies will adapt, e.g., they can use organic strategies to control pest populations.	Many jobs will be lost in the lawn care industry.

Follow-up:

In June 2002, the Supreme Court of Canada unanimously upheld the right of the Town of Hudson to pass bylaws to protect the health of its residents and the environment. Since then, numerous municipalities have enacted similar restrictions on non-essential pesticide use. For example, in 2003, Halifax, Nova Scotia, introduced an outright ban on pesticide use. Toronto plans to implement a similar ban in 2007.

Presentation Modelling

SCIENCE Grades 9-10

Presentations are commonly used in the secondary science programs to asses the students' ability to orally communicate the results of their research/investigations. However, many students are hesitant to give presentations in class; they are uncomfortable or nervous and do not clearly understand what an effective presentation looks like. By demonstrating an ineffective presentation, modelling an effective presentation, and facilitating student collaboration, teachers will ease student stress and clearly define an effective presentation.

Purpose

- To clearly define exemplary presentation skills.
- To create a comfortable, safe environment in which students can be successful in presenting.

Payoff

Students will:

- collaborate with each other and the teacher to improve the teacher's ineffective presentation.
- experience, first-hand, examples of ineffective and effective presentations.
- observe their suggestions for improvement in action.

Tips and Resources

- Teachers may consider modelling only the effective presentation. Teachers need to be cautious when demonstrating the ineffective presentation because traits or behaviours of particular students in the class may inadvertently be used. Always focus on the positive – "How can this be improved?"
- Encourage students to use their strengths when preparing a presentation. "Shy" students with strong computer skills could develop a Power Point slide show. As a result, the slide show becomes the focus of audience attention rather than the presenter.
- It may be helpful to videotape both the teacher's first presentation and the improved presentation so that students may re-examine the changes.
- For a comprehensive list of presentation tips, see Student Resource, *Tips for Effective Presentations* (p.26).
- Presentation Checklist (p.27).
- PowerPoint Presentation Checklist (p. 28).

Further Support

- Give careful consideration when determining which students will be paired together for the purposes of this strategy.
- In order to build presentation skills, have students present to a small group. Gradually increasing the size of the group will help overcome presentation anxiety.
- Have students do partial "dress rehearsals" of their presentations, particularly if equipment such as a computer projector is involved.

Presentation Modelling

SCIENCE Grades 9-10

What teachers do	What students do
Before (optional) • Prepare a brief presentation for the class that demonstrates ineffective presentation skills.	• Observe teacher's first presentation and prepare to comment on areas in need of improvement. Students should also identify "what works" in the presentation and "why it works".
During • Ask students to write down all of the things that needed improvement in the presentation. • Divide class into small groups. • Facilitate whole class discussion about the areas needing improvement. • Discuss how these improvements might take place. • Prepare a new presentation for the class, making improvements suggested.	• Write down all areas needing improvement. • Discuss ideas with a small group, compiling one list to be presented to the class. • Present ideas for improvement to the class. • Observe improved presentation. • Write down further suggestions. Discuss with the class how these suggestions may improve their own presentations.
After • Distribute *Tips for Effective Presentations* (p.26). • Facilitate a class discussion - is anything missing that needs to be added? • Ask students "What works for you? What does not work for you?" • Give students a topic for their presentations. • Divide class into pairs - these pairs will give each other constructive criticism as they prepare to present.	• Add any new ideas to their handouts. • Prepare presentations. • Practise presentations. • Work in pairs throughout practice sessions to give each other constructive criticism and helpful hints. • Before presenting, use the handout (p.26) as a checklist to ensure their presentations are effective. • Present to class.

Notes

Student Resource

Tips for Effective Presentations

SCIENCE Grades 9-10

- ☐ The opening should grab your audience's attention; you have about 30 seconds to do so.
- ☐ Identify the theme/purpose of the presentation in an interesting manner appropriate for the intended audience.
- ☐ Humour can be an effective way to capture and maintain audience interest. If the audience enjoys your presentation they are more likely to remain attentive and remember what you've said.
- ☐ Being nervous is normal! Even some of the most experienced presenters get nervous. Act confident and you will feel and appear confident. The best way to overcome your nerves is to demonstrate that you know the material well and can explain it in your own words. Be prepared! Feel confident! Smile – these people are your friends!
- ☐ Pausing is an effective way to maintain audience interest and involvement. It is important to pause periodically to allow the audience time to absorb new ideas. Take a deep breath during a pause to avoid expressions such as "ah, ok, um, like".
- ☐ Use appropriate tone, language and expression in your voice. Vary the volume and rate of your speech. Articulate clearly and project your voice.
- ☐ Match your body language to what you are saying. For example, use your hands to draw attention to a graphic. Avoid unnecessary, distractive movements such as pacing back and forth, playing with your hair, or rocking.
- ☐ Maintain eye contact with your audience. Move your eyes from one part of the room to the other in a smooth gradual motion. Glance at your notes when necessary. Avoid reading!
- ☐ Keep to the time frame given by your teacher.
- ☐ The information you present should be accurate, current, relevant, and complete. It should also be organized in a logical, concise manner. Avoid information overload.
- ☐ Effective science presentations often contain demonstrations, models, graphics (e.g., video, Power Point) to help illustrate concepts and maintain audience interest.
- ☐ The closing should sum up the theme/purpose of the presentation in an interesting manner to leave a lasting impact on your audience.

Congratulations on a great presentation!

Student Resource

Presentation Checklist

SCIENCE Grades 9-10

Criteria :	**Yes**	**No**	**Comments**
CONTENT:			
Accurate information			
Relevant			
Current			
Thorough			
Well organized			
Thought provoking			
PRESENTATION:			
Effective Introduction:			
Purpose identified			
Gets attention of audience			
Organization:			
Logical order			
Timing appropriate			
Effective use of visuals			
Appropriate and proper use of technology			
Effective use of presentation area			
Delivery:			
Good mastery of material			
Well prepared			
Addresses and answers questions			
Concluding statements answer questions			
PRESENTATION STYLE:			
Poised, positive outlook			
Makes eye contact with audience			
Clear speaking and expressive voice			
Projects voice			
Use of appropriate language and proper pronunciation			

Student Resource

Power Point Presentation Checklist

SCIENCE Grades 9-10

Criteria :	**Yes**	**No**
Overall		
The introductory slide(s) are inviting and clearly state the theme/purpose of the presentation.		
All required subtopics are covered.		
The information is accurate and current.		
The information is organised in a logical manner.		
The concluding slide(s) sum up the theme/purpose of the presentation.		
Content		
Each slide contains four or less brief sentences or bullets.		
The text is in the presenter's own words and not "pasted" from research sources.		
Material taken directly from research sources is quoted and properly referenced.		
The presenter elaborates on the text during the presentation.		
The graphics are appropriate and enhance the text on the slide (e.g., the graphics are not just decoration).		
The presenter explains the significance of the graphics.		
Format		
Text formats (e.g., colour, font, size) are carefully planned to enhance readability.		
The text can be read easily from a distance.		
The text and backgrounds work well together (e.g.., backgrounds are not distracting).		
The slide transitions are quick and not distracting.		
Writing		
The terms used are accurate and appropriate.		
Conventions for writing chemical symbols and taxonomical classifications are followed (e.g., *Homo sapiens*).		
All quantities are expressed in appropriate SI units.		
There are only a few minor errors in punctuation, or spelling.		