# Lesson Plan: Concluding Oil Spills

**Subject:** Science  **Time:** 60 minutes  **Grade:** 8

**Strand:** Understanding Matter and Energy - Fluids

<table>
<thead>
<tr>
<th>Desired Results</th>
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## Lesson Description

This lesson is the last of a four-part lesson series on fluid spills. In this series, students have been introduced to the properties of fluid spills (i.e. viscosity, density, water pollution, etc.), independently explored the cause and effects of events such as oil spills through two experiments, and individually investigated a local fluid spill through an assessment activity. In this concluding lesson, students will engage in a student-directed RAFT Activity to creatively summarize their experiential and inquiry-based findings on the cause, consequences and clean-up processes related to oil spills.

## Ontario Curricular Overall Expectations

- Analyse and assess the impact of technologies related to fluids on society and the environment;
- Demonstrate an understanding of the properties and uses of fluids.

## Ontario Curricular Specific Expectations

**Relating Science and Technology to Society and the Environment:**

- 1.1 Assess the social, economic, and environmental impacts of offshore drilling;
- 1.2 Assess the impact of the 2012 BP Deepwater Horizon Oil Spill on society and the environment, including the cost of cleanup and the effort involved;

**Developing Investigation and Communication Skills:**

- 2.3 Investigate and compare the density of water and oil;
- 2.7 Use appropriate science and technology vocabulary (see attached List of Related Vocabulary);
- 2.8 Use a variety of forms to communicate with different audiences and for a variety of purposes.

**Understanding Basic Concepts:**
• 3.1 Demonstrate an understanding of viscosity and compare viscosity of oil and water.

Lesson Goals (clearly identify what students are expected to know and be able to do, as if asked the purpose by a principal)

In this lesson, students will summarize what they have learned about:

• Causes of oil spills;
• Social, economic and environmental consequences of oil spills;
• Clean-up methods of offshore oil spills.

They are also required to:

• Work collaboratively and timely to complete their assigned/chosen RAFT activity;
• Use scientific vocabulary that was brainstormed as a class at the beginning of the lesson.
• Orally present their work to their peers.

Success Criteria (teachers will identify the criteria they will use to assess student’s learning, as well as what evidence of learning students will provide to demonstrate their knowledge and skills; in student language)

• I can work with my classmates to complete our part of the RAFT Activity;
• I can use scientific vocabulary related to oil spills;
• I can demonstrate that I understand the cause, consequences and clean-up methods related to the 2010 BP Oil Spill.

Assessment

Assessment Mode: oral/ performance/ written

Assessment Strategy:

Students will be informally assessed to examine how well they work with their peers, how well they can sympathize with their assigned/given role and audience through their completed work, how accurately and effectively they use related scientific vocabulary and concepts, and how well they can communicate their ideas to their peers.

Materials
- Computer with internet connection and projector;
- Chart paper and markers;
- Chalk and blackboard;
- RAFT Assignment Sheet (see attached).

**Lesson Format: What Teachers Do/Say**

**Minds On (10 minutes)**

As students enter the class, stand at the door way and give them a number between 1 and 7. This will automatically create 7 groups of 3-4 students.

Immediately ask students to open their science cahiers and review the past 3 lessons on oil spills. Tell students that you want them to find different words that they have learned in the past 3 lessons. Guide them by directing them to the following related documents:

- *How do you clean up an oil spill?* By Josh Clark (How Stuff Works Article)
- *Fluid Spills Data Record Sheet* (Experiment 1 Worksheet)
- *Fluid Spill Recovery: Student Worksheet* (Experiment 2 Worksheet)

Since this class relies on a rotating schedule, this brainstorming time allows students to mentally prepare for science class, return to their homeroom class if need be to find their science workbook, and allow students individual thinking time before entering into a teacher-directed group conversation. It’s an adapted Think-Pair-Share activity.

After about 2-5 minutes, ask students to share and explain different words that they have learned related to fluid spills. Write all the words on the board. If certain necessary words are not on the board, add it yourself.

**During /working on it/action (Hands on) What the students are doing**

*Introduction of RAFT Activity (5 Minutes)*

1. Explain how the class has been learning about the cause, consequences and clean-up methods of oil spills as related to the words on the board.
2. Explain that students will be working in groups of 3-4 and will be assigned/choose one of the 7 roles related to the 2010 BP Oil Spill (see attached *RAFT Assignment Sheet*). Explain that the point of this activity to broaden our perspectives and think about how interrelated humans, plants and
animals are when dealing with oil resource development.

3. Each group will be writing as though they are a certain character, to another certain character, on a certain topic, in the form of a letter, report, comic, poem, etc.

4. Explain group roles and that they can be fluid and everyone should still be involved in the brainstorming process:
   - **Coordinator**: Collects chart paper and marker and ensures the group has chosen a topic;
   - **Scribe**: Records response on chart paper;
   - **Time keeper**: Keeps group on task and ensures that they have recorded their work by given time.

5. Allow time for comments, questions and clarification.

6. Display and direct students *Slide 1* to encourage them to stay on-task and give them success criteria.

**Working on RAFT Activity (25 Minutes)**

Allow groups to work independently and rotate around the classroom to encourage on-task behaviours.

**Presentation (15 - 20 minutes):**

Allow each group to present their work in the front of the class. Applaud enthusiastically to encourage classmates to do the same.

**After: Consolidation : Reflect and Connect (10 min)**

- Thank students for the creative and hard work.
- Depending on remaining time, play videos 1 and 2 and then discuss BP’s criminal consequences after the 2010 oil spill through *Slide 2*. The videos demonstrate the environmental and social impacts for individuals living on the coastline while the slide discusses the legal impacts.
- Provide analogy: BP was fined enough money to buy enough Justin Bieber CDs to line-up from the school to the closest border to Mexico. Provide a google map on the projector screen.

**Extension Activities/Next Steps**

- This is a concluding lesson so if students are completed their assignment before the given time, they can work on their *Local Fluid Spill Research Assignment*.

**Special Education Notes**: Differentiated Instruction considerations/accommodations/assessment
Students can choose their role, audience format and topic based on their learning styles or interests with teacher discretion, or
Students can be assigned a set of choices based on pre-assessed skill levels.

The strength of a RAFT Assignment is that the teacher can assign topics that are easier or more difficult to interpret, formats that are shorter or longer, and roles/audiences that have a more relatable point of view to a less tangible perspective. It is an excellent activity to encourage differentiated learning.

**Cross Curricular Links:** Oral, reading, Writing, Media, Social Studies, Science, Math, Visual Arts, Drama, Music, PE&H, (circle)

**Oral:** This activity allows students to improve their oracy as they collaborate with their group members and as they present their work to the class.

**Writing:** This activity also gives students a fresh way to think about approaching their writing. It is also an excellent concluding activity in that it is a great way to bring together students' understanding of main ideas, organization, elaboration and coherence related to oil spills.

**Lesson Reflection: Teacher and Lesson**

**Associate Teacher:**

- Excellent summative lesson;
- Very impressed with students’ creativity and responses;
- Good change in habit of open-ended questions through Think-Share beginning activity.

**Self-Reflection:**

- I thought this lesson worked very well as a summative lesson. It was great to see how well the students incorporated learning vocabulary in their writing.
- I taught this lesson twice. In the first lesson, I allowed each group to choose their role, audience, etc. and they ended up all choosing the same two out of seven given options. The presentations were still surprisingly different but I felt that the point of the RAFT Assignment (too examine different perspectives) was lost. In the second implementation of this lesson, I assigned each group a role and it was very interesting to see the diversity of response and I think the other groups were more engaged during presentation time. I would just be sure to give roles groups based on their learning styles and interests.
- It was also interesting to see how one class thought the Bieber CD comparison was hilarious and the other class barely responded.
RAFT Assignment Sheet:

<table>
<thead>
<tr>
<th>ROLE</th>
<th>AUDIENCE</th>
<th>FORMAT</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown Pelican</td>
<td>Self</td>
<td>Diary entry</td>
<td>On being cleaned after an oil spill</td>
</tr>
<tr>
<td>Oil Clean-Up Technician</td>
<td>New Employees</td>
<td>Instruction Manual</td>
<td>On methods to clean-up oil spill</td>
</tr>
<tr>
<td>Gulf Coast Fisherperson</td>
<td>Parents</td>
<td>Letter</td>
<td>On reasons for unemployment</td>
</tr>
<tr>
<td>Deepwater Rig Worker</td>
<td>Boss</td>
<td>Work report</td>
<td>On reasons for oil spill</td>
</tr>
<tr>
<td>Gulf Coast</td>
<td>North American people</td>
<td>Poem</td>
<td>On being polluted</td>
</tr>
<tr>
<td>Fish</td>
<td>Ocean</td>
<td>Three-Panel Comic Strip</td>
<td>About first seeing the oil spill</td>
</tr>
<tr>
<td>Dolphin</td>
<td>U.S. President</td>
<td>Letter</td>
<td>Effects of oil spill</td>
</tr>
</tbody>
</table>

Slide 1:

Expectations

- **Role**: You will write as though you are...
- **Audience**: writing something to be read or heard by...
- **Format**: The writing will take the form of...
- **Topic**: and will be about...

Your group is responsible to:

- Create work from your chosen role
- Complete on chart paper by ______ o’clock
- Directly relates to given topic
- Uses scientific terminology
- Is accurate without misconceptions
Criminal Consequences

**Fines to BP Company:** $4.5 billion (criminal fines, National Fish and Wildlife Foundation, National Academy of Sciences) (Bieber CDs to Mexico border)

**Charges to BP Company:** 14 criminal charges related to rig explosion

**Charges to BP employees:** 3 criminal charges

**Video 1:** Discovery Channel – After the Catch: Oil Spill Tragedy

**Video 2:** Black Tide – Who Will Pay

**List of Related Vocabulary:**
- Skimming
- Dispersion/dispersants
- Booms
- In situ burning
- Sorbents
- Containment
- Water pollution
- Toxic pollution
- Nutrient pollution
- Viscosity
- Density
- Oil slick
- Crude oil
- Ecosystem