**Controversial Chemicals Assignment**

We seem to be constantly hearing about dangerous chemicals in the news, the damage they do, the health risks they create, the pollution they cause. Many of these chemicals are in daily use, in our environment, in the products we buy, in the foods we eat, and in the water we drink. Some of these substances have been restricted over the years, globally or sometimes just in Canada. The decisions to restrict have been made for a combination of scientific, political and economic reasons.

 **If these chemicals are dangerous and controversial, why are they still being used anywhere in the world?**

Your task is to unravel the mystery of ONE controversial substance. There is a list attached at the back of this package. Choose a substance to research. If something you’re interested in is not included on that list, please speak to your teacher about it.

You will use the Scientific Method to complete this project. The steps are outlined below:

1. Analyze the problem carefully. Write a relevant, good quality science questions.
 i.e. What is the effect of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Do some preliminary research. Look for the main arguments on both sides. Explore
3. Evaluate the evidence. Weight both sides of the argument.
4. Write a hypothesis which includes your educated guess/opinion on the effect of your particular substance in the world, environment, body (whichever is appropriate)
5. Now the real research starts. You have to challenge your hypothesis. Because this is not an ‘experiment’, you cannot actually collect materials and follow a procedure. You need to use other people’s research on the this subject. You’ll have to find quality information that confirms or disputes your hypothesis.
6. While doing your research, keep an open mind. This is to avoid bias. Be ready to accept new evidence that may not agree with your hypothesis. Try to present a balanced argument.
7. Reach a conclusion based on your research. Comment on your original purpose, your hypothesis and what you have learned while doing this project. Did you find an alternative? Is it as dangerous?

Project Details: Create a visual presentation either a power point or poster. Include each step of the Scientific Method, question and hypothesis, with the majority of your poster being the research evidence.  It should be organized into two columns, PROS and CONS, with each piece of evidence and argument clear, adequately detailed and explained - not just jot notes.  Your final conclusion should be written at the bottom of your Bristol board.

* Your reference tracking sheets must be included with your research.  Create a bibliography slide in your

power point or a list on your Bristol board.

* **Any plagiarism will result in a mark of zero and the requirement that a new project be completed.**

**Controversial Elements and Compounds**

acetamide MEA

acetone, linalool, and alpha-hydroxy acid

**Glossary**

**Carcinogen:** (Carcinogenic): Known to be cancer causing.

**Humectant:** a product that helps the skin retain moisture. Vegetable glycerine is a humectant.

**Mutagenic:** Changes the genetic code, which is the plan for the building of cells & tissues.

**Toxic:** Poisonous, either short-term or long-term.

aluminum

ammonium laureth sulphate

a-pinene

asbestos

aspartame

benzene

Bisphenol-A

brominated flame retardants

calcium chloride (road salt)

camphor

coal tar derivatives

DDT

DEET (insect repellent)

diethanolamine (DEA)

dioxane

dioxin

ethanol

ethyl acetate

ethylacrylates: acrylates and methacrylates

formaldehyde

lead

mercury

monosodium glutamate (MSG) and artificial

colourings

PABA (para-amino-benzoic acid)

parabens (benyl, butyl, ethyl, isopropyl,

methyl, propyl (alkyl-p-hydroxybenzoates))

phosphoric acid

phthalates

propylene glycol

sodium benzoate and potassium benzoate

sodium lauryl sulphate

toluene

triclosan

triethanolamine (TEA)

**Controversial Chemicals Assessment Rubric**

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| --- | --- | --- | --- | --- | --- |
| **Criteria** | **Level 4** | **Level 3** | **Level 2** | **Level 1** | **R** |
| **Knowledge and Understanding**Research evidence | High quality, extensive information is included, clearly and thoroughly documented in project | Most relevant information is included and clearly documented in project | Some relevant information is included, some may be minimally presented or unclear | Limited information is included, some is confusing, inadequate or unclear | Inadequate information is included, many errors and/or omissions |
| **Thinking / Investigation**Use of initiating & thinking strategies, planning and analytical skills | Formulates high quality, relevant question, thoughtful hypothesis and valid, detailed conclusion from acquired data | Formulates good, science question, relevant hypothesis and valid conclusion from acquired data | Formulates satisfactory science question and/or, adequate hypothesis and/or solid conclusion from acquired data | Formulates fair, science question and/or fair hypothesis and/or adequate conclusion from acquired data; some part(s) missing | Inadequate or missing science question, hypothesis and/or conclusion |
| **Application**Makes connections between science, technology, society and the environment | Thorough, articulate analysis of social, economic, technological and environmental issues associated with chemical use | Considerable analysis of social, economic, technological and environmental issues associated with chemical use | Some analysis of social, economic, technological and/or environmental issues associated with chemical use  | Limited analysis of social, economic, technological and/or environmental issues associated with chemical use  | Inadequate or erroneous analysis of issues presented or omitted completely |
| **Application**Response to Research | Thoughtful, insightful analysis of issues, clearly stated opinions based on data, effective ideas for practical action on issue | Considerable analysis of issues, well stated opinions based on data, ideas for practical action on issue | Some analysis of issues, stated opinions based on data, some ideas proposed for action on issue | Limited analysis of issues and/or stated opinions loosely based on data, limited ideas for action on issue | No analysis submitted and/or not based on data and/or no ideas for action |
| **Communication**Documentation of sources | Includes numerous, high quality and varied sources, properly referenced as required | Includes suitable, varied sources, all properly referenced as required | Includes few and/or somewhat questionable and/or somewhat varied sources, a few minor errors or omissions in documentation | Includes inadequate and/or questionable and/or repetitive sources and/or some errors or omissions in documentation | No documentation of sources received |
| **Communication**Organization & expression of information | Research data thoroughly organized and expressed in jot notes extremely effectively | Research data well organized and expressed in jot notes effectively  | Research data organized and expressed in jot notes with some effectiveness | Research data organized and expressed in jot notes with limited effectiveness | Jot notes not submitted or show lack of organization and/or ineffective expression of data |
| **Communication**Written Presentation | Outstanding presentations, neat, well-designed presentation, with excellent spelling and grammar, correct formats in question & hypothesis | Good presentations, neat, planned, and legible, with good spelling and grammar | Adequate presentations, some evidence of planning, somewhat neat & legible, some spelling and grammar errors | Barely meets minimum presentation requirements, shows little planning, hardly legible, many spelling and grammar errors | Sloppy, illegible, full of spelling and grammar errors or no poster submitted |