**Greeley/Evans School District 6**  
6, 7, & 8th Grade  
**Logic & Reasoning**

<table>
<thead>
<tr>
<th>Unit 1: Introduction of Essential Questions</th>
<th>Timeline: 12 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enduring Concept:</strong> Students will understand the importance of using logic and/or reasoning as critical thinking skills</td>
<td></td>
</tr>
</tbody>
</table>

**Colorado State Standards**

**Grade Level Expectations:**

- **Reading, Writing, and Communicating**
  - 9.1.1 Oral presentations require effective preparation strategies
  - 9.2.2 Increasingly complex informational texts require mature interpretation and study
  - 8.2.3 Context, grammar and word choice influence the understanding of literary, persuasive, and informational texts
  - 12.3.3 Ideas, evidence, structure, and style create persuasive, academic, and technical texts for particular audiences and specific purposes
  - 6.4.2 Assumptions can be concealed, and require identification and evaluation
  - 7.4.1 Answering a research question logically begins with obtaining and analyzing information from a variety of sources
  - 7.4.2 Logical information requires documented sources
  - 7.4.3 Reasoned material is evaluated for its quality using both its logic and its use of a medium
  - 8.4.1 Individual research projects begin with information obtained from a variety of sources, and is organized, documented, and presented using logical procedures
  - 8.4.2 Common fallacies and errors occur in reasoning
  - 8.4.3 Quality reasoning relies on supporting evidence in media
  - 9.4.1 Informational materials, including electronic sources, need to be collected, evaluated, and analyzed for accuracy, relevance, and effectiveness for answering research questions
  - 9.4.2 Effective problem-solving strategies require high-quality reasoning
  - 10.4.1 Collect, analyze, and evaluate information obtained from multiple sources to answer a question, propose solutions, or share findings and conclusions
  - 10.4.2 An author’s reasoning is the essence of legitimate writing and requires evaluating text for validity and accuracy
  - 11.4.2 Complex situations require critical thinking across multiple disciplines
  - 12.4.2 Logical arguments distinguish facts from opinions; and evidence defines reasoned judgment
Vocabulary:

1) **logic**: the science that studies the formal processes used in thinking and reasoning
2) **reasoning**: the drawing of inferences or conclusions through the use of either informal or formal logic
3) **belief**: a feeling of being sure that someone or something exists or that something is true
4) **bias**: a tendency to believe that some people, ideas, etc., are better than others
5) **judgment**: an opinion or decision that is based on careful thought
6) **assumption**: a fact or statement (as a proposition, axiom, postulate, or notion) taken for granted
7) **bias**: a tendency to believe that some people, ideas, etc., are better than others
8) **opinion**: a belief, judgment, or way of thinking about something: what someone thinks about a particular thing
9) **deductive logic**: in a valid deductive argument, if the premise *is true*, then the conclusion must be true. The truth of the premises provides a guarantee of the truth of the conclusion.
10) **inductive logic**: in a good inductive argument, the premises should provide some degree of support for the conclusion. The truth of the premises indicates with some degree of strength that the conclusion is true.
11) **premises**: “propositions” or claims that support the **conclusion** (consequence of premises in an argument)
12) **valid & invalid arguments** (either follow the premises or do not)
13) **syllogism**: has at least two premises followed by the conclusion that the student must draw from the premises.

Student Inquiry Questions:

1. How do we know if information can be “trusted”?
2. How can arguments be determined to be valid or invalid?
3. How can arguments be constructed to convince an audience of one’s position?
4. How is propaganda used to convince an audience?
5. How can we make better inferences from given information?
6. When is it appropriate to use logic, reasoning, and/or judgment in decision making?
7. How can we effectively communicate in written and oral speech using the tools of Logic and reasoning?
Together the premises and resulting conclusion make either a valid or invalid argument. The conclusion must be true if we accept that the premises are true.

14) **tautology**: needless repetition of an idea, statement, or word
15) **analogy**: a comparison of two things based on their being alike in some way
16) **logical inference**: the act or process of reaching a conclusion about something from known facts or evidence
17) **correlation vs. causation**, “If/then” statements, fallacy of questionable cause
18) **rhetoric**: ethos, pathos, & logos
19) **fallacies & propaganda**
20) **non-sequitur**: a statement that is not connected in a logical or clear way to anything said before it. An inference that does not follow from the premises.

---

**Evidence Outcomes**

**Students will be able to:**
- Distinguish fact from opinion and bias in a variety of texts and media
- Recognize analogies, both visual and verbal, and similar analogies (synonyms) and opposite analogies (antonyms)
- Recognize the difference between an all statements (true for all members of a group) and their reversals
- Create an argument (syllogism) using valid premises (all statements and/or no statements) with a conclusion that follows the premises (valid) or does not (invalid)
- Distinguish valid arguments and counter arguments
- Know when it is appropriate to use logic and when it is appropriate to use reasoning to solve problems
- Complete a reasoning event around a topic that allows for multiple perspectives and multiple solutions
- Give a persuasive argument with supporting evidence using a balance of ethos, pathos, and logos
<table>
<thead>
<tr>
<th>WEEK 1</th>
<th>WEEK 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E.Q.</strong> How do we know what we know? How can we trust information if we don’t know the source? Teaching: *Have students take pre-test on logic and reasoning 6th grade: see attached 7th grade: see attached 8th grade: (<a href="http://www.harryhiker.com/logic.htm">http://www.harryhiker.com/logic.htm</a>) this is an interactive test</td>
<td></td>
</tr>
<tr>
<td>*Introduce vocabulary (in interactive notebook – each term, one page to reflect concept learning) Introduce how to use the interactive notebook (Part of AVID curriculum. Contact AVID coordinator) *Find examples of bias in news articles, etc. and have student point out facts from opinions. Have them practice creating statements of fact vs. statements of opinion <a href="http://www.abacon.com/twt/cred.html">http://www.abacon.com/twt/cred.html</a> <a href="http://www.abacon.com/twt/critical.html">http://www.abacon.com/twt/critical.html</a> <a href="http://charlotteteachers.org/2012/05/think-teaching-logic-in-the-elementary-or-middle-grades-classroom/">http://charlotteteachers.org/2012/05/think-teaching-logic-in-the-elementary-or-middle-grades-classroom/</a></td>
<td></td>
</tr>
<tr>
<td><strong>E.Q.</strong> What is the difference between logic and reasoning? Teaching vocabulary: *belief, bias, &amp; judgment *inductive/deductive reasoning *premises &amp; conclusions *syllogisms Premises and conclusions: <a href="https://www.youtube.com/watch?v=OpNoCmNtP5c">https://www.youtube.com/watch?v=OpNoCmNtP5c</a> making arguments: <a href="https://www.youtube.com/watch?v=FSAWrqavYg0">https://www.youtube.com/watch?v=FSAWrqavYg0</a> If/then statements from Alice in Wonderland: <a href="http://kalamitykat.com/2010/08/29/alice-in-wonderland-logic/">http://kalamitykat.com/2010/08/29/alice-in-wonderland-logic/</a> Have students begin their novel. You may use the William &amp; Mary Navigator for the following books. (contact building GT specialist) These Newberry winners were chosen for this elective as they challenge students to develop their skills at analyzing and interpreting literature. They also present moral dilemmas to the characters within them and invite real world connections and analogies as well. 6th grade: The Egypt Game 7th grade: The Dark is Rising 8th grade: The Giver *Of course, alternate, challenging novels may be substituted as are available (Wrinkle in Time, Fahrenheit 451, Book Thief, etc.)</td>
<td></td>
</tr>
<tr>
<td>WEEK 3</td>
<td>WEEK 4</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>E.Q.</strong> Which decisions should be made logically? When is using logic not helpful in decision making?</td>
<td><strong>E.Q.</strong> When does one set of facts <em>cause</em> another? When does one set of facts exist independently, and no logical correlation can be made?</td>
</tr>
<tr>
<td>Teaching vocabulary:  <em>analogy</em>  <em>logical inference</em></td>
<td>Teaching vocabulary:  <em>correlation vs. causation</em></td>
</tr>
<tr>
<td><strong>Sample Lesson:</strong> Have students brainstorm types of decisions we make on a day to day basis – whether as individuals or groups (like governments) etc. Have students sort and re-sort examples of decisions – how are these decisions alike? Different? What skills and knowledge do we need to make better decisions? (William &amp; Mary: Paul’s Reasoning Model)</td>
<td><strong>Sample Lesson:</strong> Have students generate ideas in history where a cause and/or correlation was given to explain disease (ex. phrenology) Examine other past concepts that we now know to be superstitions that at the time were taken as fact. What “truths” do we accept today that might prove to have no relationship to perceived causes?</td>
</tr>
</tbody>
</table>
| * Have students practice seeing figural analogies  [Critical Thinking Books](#) by Sandra Parks & Howard Black (contact building GT specialist) | Teaching:  *rhetoric: ethos, pathos, logos*  
Resource:  [http://www.youtube.com/watch?v=rFcCFEeOEeg](http://www.youtube.com/watch?v=rFcCFEeOEeg) |
| **Continue with novel.** It is suggested that students complete a literature web, journal entries, “one-pagers” (AVID) and or class blog discussing essential questions (on Schoology) as they progress through the book. | **Lesson:** Have students analyze famous speeches for rhetoric (MLK “I Have a Dream”, Gettysburg Address”, etc.). Where do they find logos, pathos, and ethos (be able to identify the specific emotion/appeal) in each? Is the placement of these rhetorical devices in the text relevant? Why? |
| **Continue with novel.** Examine examples of cause and effect in the novel, foreshadowing, etc. | |
| WEEK 5 | E.Q. How is propaganda used to convince an audience when logic would not be effective?  
Teaching vocabulary:  
*propaganda  
*fallacies: (most referred) ad hominem, hasty generalization, band wagon, questionable cause, slippery slope, etc.  
Resource: Illustrated Book of Bad Arguments by Ali Almossawi  
Sample Lesson: Have students examine posters from WWII. Identify the various propagandistic arguments used to rally patriotic support for the Allies (remember, Americans were not supportive of the war initially) and those used to negatively portray the Axis powers  
Library of Congress:  
[http://www.loc.gov/pictures/search/?q=wwII%20propaganda%20posters](http://www.loc.gov/pictures/search/?q=wwII%20propaganda%20posters)  
other sources on logic terms:  
[http://www.nizkor.org/features/fallacies/](http://www.nizkor.org/features/fallacies/)  
Continue with novel. | WEEK 6 | E.Q. How can we make decisions or plan a course of action in regard to an issue when there are multiple stakeholders with multiple points of view?  
Teaching vocabulary:  
*assumption  
*inference  
Sample Lesson:  
Reasoning Event – This model is in the William & Mary curriculum – please contact your Gifted & Talented specialist for materials and suggestions. This will take a minimum of one week to complete with the class. It is important for students to take a stand on the issue before they participate in the reasoning event and then examine if their opinion changed as a result and why.  
1) choose an issue and have students take an initial position  
2) identify stakeholders and their respective points of view  
3) have students get in pairs or small groups to represent a stakeholder group and research supporting data for their position  
4) each stakeholder group builds their argument  
5) conduct a reasoning event  
6) have students share if their position on the issue was changed  
Continue with novel. |
### WEEK 7

**E.Q.** How can a persuasive argument be organized for maximum effect?

Debrief the reasoning event; what went well? What was learned? Were their previous assumptions challenged?

**Teaching vocabulary:** *claim, data, warrant*

**Sample Lesson:** Have students write a persuasive essay outlining a **claim** in their thesis, showing supporting evidence **(data)** and concluding with a **warrant**.

Students should pair up and using a writing protocol, give each other feedback before writing their final draft for publishing. When conferencing, the students should also be able to cite which rhetorical devices they used, and how well these supported their argument.

Encourage students to publish their essay – as a letter to the editor, “This I Believe” essay, a letter to their representative, or as a manifesto, etc.

**Continue with novel.**

### WEEK 8

**E.Q.** How do we pick sources when we conduct research? How can they be judged for the validity of their content?

**Conducting Research:** Individual research project

**Teaching:**
* Apply elements of reasoning wheel to their own topic

**Sample Lesson:** Students may want to conduct further research around the previous issue or they may want to conduct a reasoning event about the novel; how a character changed or how the events of the novel have brought different “stakeholders” (characters) to a new realization.

Allow research students to pursue their own direction for further.

**Resource:** finding valid resources [https://owl.english.purdue.edu/owl/resource/553/01/](https://owl.english.purdue.edu/owl/resource/553/01/) [https://owl.english.purdue.edu/owl/resource/588/02/](https://owl.english.purdue.edu/owl/resource/588/02/)

**Continue with novel.**
| WEEK 9 | Continue with individual or group research projects.  
|        | Continue with novel. | WEEK 10 | Continue with individual or group research projects.  
|        |                       | WEEK 11 | Project symposium  
|        |                       |        | Students are encouraged to share their learning in a symposium  
|        |                       |        | Suggestions:  
|        |                       |        | - A panel discussion or debate on a topic (could use the topic of the reasoning event or related)  
|        |                       |        | - Interpretive project based on the novel (character portrayal, re-write the ending, reader’s theatre, round-table discussion with students playing the main characters, change the narrator’s point of view (ex. from first person the third etc.)  
|        |                       |        | - Conduct a reasoning event to help solve a problem with another class, staff, etc.  
|        |                       |        | - Share their research papers publically with a power point, video production, or poster presentation, etc. at parent teacher conferences | WEEK 12 | Course wrap-up – Projects:  
|        | Self-edit using the rubric and use peer editing through a protocol (see attached) | Assessments  
|        |                       |        | Formative Assessment Options:  
|        |                       |        | - Pre-assessment  
|        |                       |        | - Self-assessment on rubrics for persuasive essay, presentations  
|        |                       |        | - Feedback Survey  
|        |                       |        | - Informal conferencing with teachers  
|        |                       |        |
Support Resources:
- Illustrated Book of Bad Arguments by Ali Almossawi
- The Logic of Alice: Clear Thinking in Wonderland by Bernard M. Patten
- Critical Thinking Books by Sandra Parks & Howard Black (ask building GT specialist)
- William & Mary Navigators, (ask building GT specialist)

William & Mary literature models:
- https://education.wm.edu/centers/cfge/curriculum/languagearts/index.php

General information on logic:
- http://www.nizkor.org/features/fallacies/
- http://charlotteteachers.org/2012/05/think-teaching-logic-in-the-elementary-or-middle-grades-classroom/

Finding valid resources:
- https://owl.english.purdue.edu/owl/resource/553/01/
- https://owl.english.purdue.edu/owl/resource/588/02/

Multi-media sources:
Statements (if/then) using passage from Alice in Wonderland:

Ethos, Pathos, & Logos:
- Animated: http://www.youtube.com/watch?v=LwOTGeRwQqY
- Persuaders in history: http://www.youtube.com/watch?v=LwOTGeRwQqY
- Good outline: http://www.youtube.com/watch?v=rFcCFEeOEeg

Premises and conclusions:
- https://www.youtube.com/watch?v=OpNoCmNtP5c
- Making arguments:
- https://www.youtube.com/watch?v=FSAWrqavYg0