

Canton Intermediate School Presents

ICEBER

2009

WHAT IS ICER?

ICER (Invent, Classify, Experiment, and Research) is a child-centered, noncompetitive science celebration for students. All students at Canton Intermediate School are encouraged to investigate a **scientific topic** and display the results of their study at our annual Science Night.

Students choose a scientific topic to explore and decide the best way to present their findings. The types of projects are:

- Invention**
- Classification**
- Experiment**
- Research**

Each of the above projects has specific criteria that must be followed. These criteria are listed on the following pages. Students are encouraged to choose a type of project to complete that best fits their learning style. Students should also be actively engaged in the development of their exhibit, researching their scientific topic, and applying the scientific process.

HOW DOES ONE ENTER ICER?

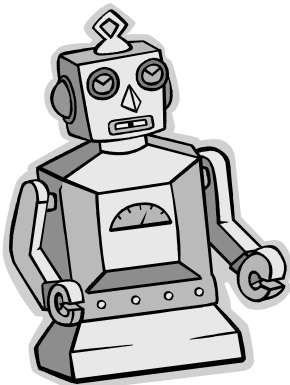
To enter ICER, please read through this packet carefully and then complete the **ICER entry form** that is included on the last page of this packet. *It is important that every student who enters ICER turns in an entry form by **December 2ND**.* Students will meet with Mrs. Deltano or Miss Zimmerman to determine project approval.

WHAT IS NEXT?

- Choose a **scientific topic** of interest. Think of something that interests you. Decide on the best way to display the information that you gather.
 - If you are thinking of creating something, you would consider building an **invention**.
 - If you would like to collect something to classify and group in a particular order, you would consider constructing a **classification project**.
 - If you have a question you would like answered, you would consider exploring through **experiments**.
 - If you want to complete an in-depth study of a scientific topic or scientist, you would consider **research**.
- **Complete** your project **no later than January 27th**. Make sure that the project has met all the criteria.
- Your project will be assessed by Mrs. Deltano and Miss Zimmerman. If needed, you will be given time from January 30th- February 3rd to make the necessary adjustments so your project fully meets the criteria **by February 3rd**.
- You will need to stay after school on February 4th for about 30 minutes to help set up for Science Night.
- Bring your family and friends to the ICER celebration during Science Night on February 4th.

TYPES OF EXHIBITS

There are 4 types of ICER exhibits. Choose the one that interests you.



Invention

Developing an original idea or improving an existing idea

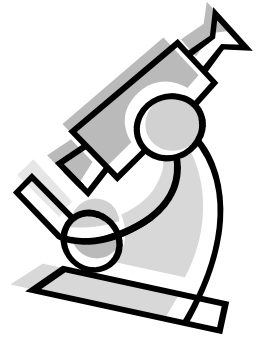
Classification

A gathering of objects of a central theme organized in a scientific way



Experiment

An experiment involving the scientific method



Research

Using resources to discover information about a topic you are curious about



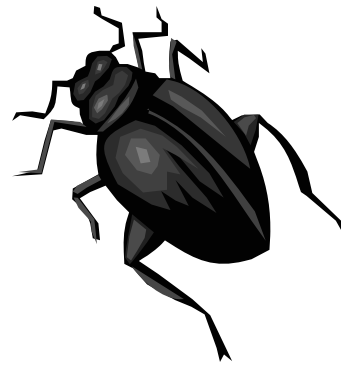
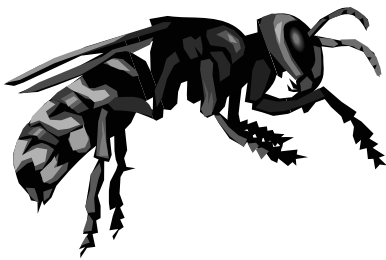
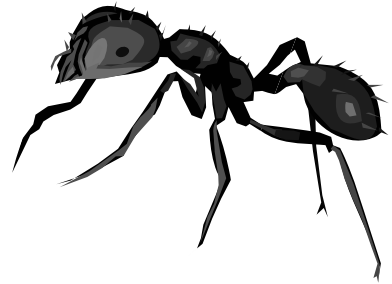
CRITERIA FOR AN INVENTION

1. An invention must be the product of a single inventor. Pair or group inventions are not allowed.
2. An invention must meet the following definition:

An invention must have utility; it must solve a real problem. It is something that no one has ever made before. It cannot be purchased in a store or found in a book. An invention may be a non-obvious improvement to an existing object that yields new utility
3. The cost of the invention should not exceed \$25. Inventors are encouraged to use recycled materials.
4. The invention must be accompanied by a self-standing display board (requiring no more than 24 inches of table space) that includes the following information:
 - The title of the invention
 - A description of the problem the invention solves
 - A description of how the invention works
 - The inventor's name, grade, and school
5. The inventor must submit a log or report that includes the following information:
 - A written statement of the purpose of the invention and the problem it solves
 - A list of materials used
 - A list of steps taken to complete the invention, including a description of any problems encountered and drawings or pictures of attempts that failed
 - A statement of originality, including description of what the inventor did to establish that the invention does not already exist, with parent verification
6. The invention must be accompanied by a self-standing display board (requiring no more than 24 inches of table space) that includes the following information:
 - The title of the invention
 - A description of the problem the invention solves
 - A description of how the invention works
 - The inventor's name, grade, and school
7. The invention must fit in a space that is two feet by two feet; larger invention should be represented by a working model.
8. **Remember that this is the invention's introduction to the world. Do your best work!**
9. Students have the opportunity to continue to the school invention convention to be considered for the Connecticut Invention Convention held at the UCONN Storrs Campus.

CRITERIA FOR A CLASSIFICATION PROJECT

- _____ Science oriented
- _____ Contains no live specimens
- _____ Contains no non-living vertebrates
- _____ Contains no nests, feathers, or animal homes
- _____ Clear title indicates items gathered
- _____ Items clearly identified and labeled
- _____ Arranged to show some kind of relationship (type, size, characteristic or other)
- _____ Contains paragraph explaining scientific relevance



CRITERIA FOR AN EXPERIMENT

- _____ **Testable Question:** The problem of the investigation is stated as a question. The question must be one that is testable. This can also function as the title of the exhibit.
- _____ **Research:** Background information is researched about the testable question. (Two to four paragraphs of information.)
- _____ **Bibliography:** All references must be acknowledged. (Two to four sources of information.)
- _____ **Hypothesis:** After completing your research, make a hypothesis of what you think is going to happen while performing the investigation. It is recommended that this be stated in an "if-then" statement. (*See experiment explanation page*)
- _____ **Variables:** Students shall include variables which are being tested. (*See experiment explanation page*)
- _____ **Safety:** Any safety precautions for completing the investigation shall be listed.
- _____ **Experiment:** A list of all materials needed to complete the Investigation will be listed, as well as a step by step procedure of how to perform the experiment. This is the ingredients and recipe of the investigation. While performing the experiment one should perform repeated trials. This assures that enough data is gathered to gain accurate data. (*See experiment explanation page*)
- _____ **Data:** The collected data will be presented in table or chart form. This table will then be converted into an appropriate graph (bar, line, or pie). The display must contain a chart and a graph.
- _____ **Conclusion:** An answer is given to the original testable question. Students analyze the data and explain why they think their results occurred.
- _____ **Scientific Worth:** The effects of the experiment on the student's lives are addressed. What did the student learn? Why was the investigation done? How does this information relate to their life? What additional labs could be performed as a result of the original investigation?

EXPERIMENT EXPLANATION

PAGE

Hypothesis – A hypothesis is much more than an educated guess. It is a statement that can be tested. It also states a relationship between variables.

A good hypothesis is often stated in a cause and effect relationship. In doing this it is recommended that it is written in an “if – then” statement; “*If I do this, then I believe this will happen.*” An example of this is, “*If a magnet is dropped, then it will get weaker.*”

Variables – Variables are a very important part of performing an investigation in science. The three kinds of variables that your project should include are:

- Independent Variable (also called a manipulated variable) is a variable that the experiment deliberately changes or manipulates in an investigation
- Dependent Variable (also called a responding variable) is a variable that changes in an investigation in response to changes in the independent variable
- Control variables (also considered a constant) are variables that are deliberately kept constant or unchanged in an investigation in order not to confound the results

Experimenting and Collecting Data - By using variables correctly, this will ensure that fair testing measures are being met. Fair testing is important because it demonstrates that the findings are accurate.

While performing an experiment, students must show that they have used repeated trials. By repeating the experiment several times, there will be more data to use to draw conclusions about the test.

It is critical that you have a testable question. Collecting data and completing a survey is not an investigation.



CRITERIA FOR RESEARCH

- _____ Select a topic that is of scientific relevance. The project will be an in-depth study of a scientific topic.
- _____ Choose one way to present your information AND write a research report about what you learned about the topic.

CHOOSING A TOPIC OF STUDY

Think of something that is of interest to you that is related to science. The topic should be something in which you want to become an expert. The topic should not be something that has nothing to do with science. The relevance should be obvious. Think of a noun; person, place or thing. Be creative! Select a topic that is not common. Try not to do a pet.

Some good choices are: invertebrates, planets, famous people who made contributions to science

Some choices that are not acceptable: social studies topics, sports, cities, states, countries, wars and conflicts, ships

RESEARCH

PRESENTATION IDEAS

Cartoon Brochure
Collage Crossword Puzzle
Diorama Fact Sheet
Drawing Journal or Diary
Flip Book Letter of Persuasion
Mobile
Newsletter
Origami Poem
Painting Story
Pointillism Song

Diagram Audio Tape
Essay Circuit Board or Board Game
Graphic Organizer Graph
Interview Model
Photographs (original)
Power Point
Survey Puzzle
Time Line Spread Sheet
Video

DECIDING A TOPIC FOR EXPERIMENTS OR RESEARCH



Experiment:

Sometimes thinking of an idea can be the most difficult part of completing an ICER project. After you come up with an idea, turning that idea into a testable question can be hard.

A good website to use if you are stuck trying to think of ideas or coming up with a question if you are completing an experiment is:

http://www.sciencebuddies.org/mentoring/project_question.shtml

Always remember that an experiment must show scientific worth. A good example of this is:

*Why is it difficult to observe the nighttime sky in the city? Or
What affects the rate of a pendulum?*

An example of a question that does not have scientific worth might be:

Which fingernail polish stays on the longest? Or What kind of dog is my class's favorite?

Research:

Research can be a great way to become an expert on a scientific topic. Choosing the topic is tricky. When you select your topic, be sure it has scientific worth.

Good projects: Albert Einstein, puffins, oil, mollusks, mites, Europa

Not acceptable: football, Spain, dolls, The Titanic, trains, automobiles

DISPLAYING PROJECTS

All exhibit materials must be arranged and attached to a display.

The display:

- Must have a self supporting back and an attached base. Sides are optional.
- Cannot have chemicals.
- Cannot have live specimens.
- Should not have valuables attached.
- Should not show pictures of students (faces).
- Must have your name.
- Must not have staples that are open or exposed backs. Please attach pieces with tape or glue.
- Must have a bibliography that states resources.
- Must pass the "Shake" test. Pick up the project with one hand and give it three shake. All pieces must stay on.

TRANSPORTING PROJECTS

- All projects should be transported to school as safely as possible.
- Projects will be set up and placed by the student after school on February 4th.
- Projects should be taken home the evening of Science Night on February 4th.



LOCATING AND USING RESOURCES

When you decide upon a project type and a topic the first thing you should do is gather information. Consider possible places to gather the information, what kind of information to gather, and if the sources are reliable.

Some of the possible places you can find information are your school library or librarian, the public library, the Canton School District web resource page, encyclopedias, atlases, almanacs, magazines, interviewing an expert, the internet, newspapers, video or television.

Because you have gathered good information, it is important that you give credit to your sources. This is the key to good research. By doing this, you will create a bibliography.

What is a bibliography?

A bibliography is an alphabetical list of all materials consulted in the preparation of your project.

Why must you do a bibliography?

- Acknowledge and give credit to sources of words, ideas, diagrams, illustrations, quotations borrowed, or any materials summarized or paraphrased
- Show that you are respectfully borrowing other people's ideas, acknowledging that these are not your original ideas
- Offer additional information to your readers who may wish to further pursue your topic
- Give readers an opportunity to check out your sources for accuracy. An honest bibliography inspires readers' confidence in your writing.



HOW DO I CREATE A BIBLIOGRAPHY?

Example:

Shulman, Mark. Discovery Channel: Wicked Weather.

Des Moines: Meredith, 2006.

A good resource to help you complete this bibliography is to go on the internet and type the url: www.noodletools.com

Upon entering this site, use the "NoodleBib" MLA starter. You can create an ID and use this tool to create many different bibliographies. Adding bibliographies to work anytime you use resources is a good habit to establish.

PARENTS/GUARDIANS:

HOW MUCH HELP?

- Be a **questioner** to help achieve focus and clarity. Guide the students rather than lead. Encourage students to make their own decisions and use the inquiry approach.
- Be a **helper** by answering questions on the "how to" parts of the entry. A learner might require help remembering how to set up a graph or chart. Show them how but don't do it for them.
- Be an **assistant** when children need extra hands. Some tasks are just too difficult to do alone. Help reach hard to get items or help them organize time and information.
- Be a **coach** for students who need help. Show or remind how to use information of assist in finding appropriate search tools.

- Be a **runner** for various materials that the child might need. A child might need materials for the project or they could need to visit a site to enhance their study. Help join in on learning by engaging in appropriate trips to places.
- Be a **wise listener** when children want to share ideas. Allow the child to discuss progress and show interest in the student's project.
- Most of all, be an **encourager!** Allow children to do their own quality work. Children will perform best if they know they have support from teachers and parents/guardians. Let them know how well they are doing and how proud you are of their accomplishments.

Completing an ICER project is about learning a process. The project will be exemplary if the process of inquiry is followed.



ICER ENTRY FORM



Student name: _____

Teacher/grade: _____

Which of the 4 types of projects will you do? _____

What will your topic be? _____

Why did you choose this topic? _____

The steps you will take to complete your project are:

1. _____

2. _____

3. _____

4. _____

5. _____

Problems I may have along the way are: _____

Student signature

Parent/Guardian Signature

Approved by: _____

Date approved: _____