Honey Bees

*Lesson Plan for Grade 6 , English Language Arts*

*Prepared by NAITC*

*Modified by Mississippi State University, School of Human Sciences*

*for Mississippi Farm Bureau Federation - AITC*

# OVERVIEW & PURPOSE

Through project-based learning, students solve the problem of excess beeswax, a byproduct of honey bees, by developing a useful beeswax product and marketing their product to be sold in a local boutique or farmers market.

# EDUCATION STANDARDS

**Mississippi College-and-Career Readiness Standards:**

SL.6.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others’ ideas and expressing their own clearly.

SL.6.4 Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.

**NALOs**

T5.6-8.b Distinguish between careers in production (farmers and ranchers) with those that directly involve consumers (business and nutrition)

T3.6-8.i Identify sources of agricultural products that provide food, fuel, clothing, shelter, medical, and other non-food products for their community, state, and/or nation

T4.6-8.g Identify science careers related to both producers and consumers of agricultural products

OBJECTIVES

* Students will be able to describe how beeswax is produced.
* Students will be able to identify products that are made with beeswax.
* Students will be able to create a marketable product that uses the byproduct of beeswax.
* Students will be able to identify effective ways to market a product.

# MATERIALS NEEDED

Milestone 1: Entry Event

* [Honey Extraction Start to Finish](https://www.youtube.com/watch?v=4O1IQkhVPAI&feature=youtu.be) video
* [Beeswax: A Byproduct of Honey Production](https://cdn.agclassroom.org/media/uploads/2019/11/15/Beeswax.pptx) PowerPoint Slides
* [Made With Beeswax Pinterest Board](https://www.pinterest.com/agclassroomstore/made-with-beeswax/)
* [Beeswax Pinterest Board](https://www.pinterest.com/agliteracy/beeswax/)
* [101 Uses for Beeswax](https://www.meadowlilyfarm.com/101-uses-for-beeswax/)
* Paper-based or electronic team notebook, 1 per team

Milestone 2: Planning and Design

* Team notebooks
* [Product Rubric](https://cdn.agclassroom.org/media/uploads/2019/11/16/Product_Rubric.pdf)

Milestone 3: Prototype

* [How Burt's Bees Lip Balms are Made](https://www.youtube.com/watch?v=3nHNKPfySx4&feature=youtu.be) video
* Hot plate or stove top
* Small saucepan
* Glass jars (8 oz or 236 mL)
* Glass jars (4 oz or 118 mL)
* Hot pad
* Measuring spoons (tablespoon or mL)
* Water
* Wax paper
* Beeswax pellets\*
* Coconut oil\*
* Shea butter\*
* Pipettes\*
* Stir sticks\*
* Flavor oil\*
* Lip balm tubes\*
* Portion cups,\* 1 per team
* Cotton swabs, 1 per student
* Team notebook

\*These items are included in the [Beeswax Lip Balm Kit](https://agclassroomstore.com/beeswax-lip-balm/), which is available for purchase from agclassroomstore.com.

Milestone 4: Marketing Plan and Final Product Presentation

* [The 4 Ps of the Marketing Mix Simplified](https://www.youtube.com/watch?v=Mco8vBAwOmA) video
* [Marketing Mix Graphic Organizer](https://cdn.agclassroom.org/media/uploads/2019/11/16/The_Marketing_Mix_Graphic_Organizer.pdf)
* Team notebook
* [Presentation Rubric](https://cdn.agclassroom.org/media/uploads/2019/11/16/Presentation_Rubric.pdf)
* Peer Collaboration Evaluation (Use this [template and instructions](https://alicekeeler.com/2017/04/26/google-form-peer-collaboration-evaluation-template/) to create a Peer Collaboration Evaluation Google Form customized to your class.)

Essential Files (maps, charts, pictures, or documents)

* [Beeswax: A Byproduct of Honey Production Slides](https://cdn.agclassroom.org/media/uploads/2019/11/15/Beeswax.pptx)
* [Presentation Rubric](https://cdn.agclassroom.org/media/uploads/2019/11/16/Presentation_Rubric.pdf)
* [Product Rubric](https://cdn.agclassroom.org/media/uploads/2019/11/16/Product_Rubric.pdf)
* [The Marketing Mix Graphic Organizer](https://cdn.agclassroom.org/media/uploads/2019/11/16/The_Marketing_Mix_Graphic_Organizer.pdf)

# Lesson Set Up:

* Refer to the links below to access detailed information regarding lesson set up and materials needed:
  + [Milestone 1: Entry Event](https://docs.google.com/document/d/1NB35ZoKwXMawufHfZ95Jo4KrJv48kx7RaJnyo3d85-Y/edit#bookmark=id.mbb09f9wjdgy)
  + [Milestone 2: Planning and Design](https://docs.google.com/document/d/1NB35ZoKwXMawufHfZ95Jo4KrJv48kx7RaJnyo3d85-Y/edit#bookmark=id.12gdj54oie9t)
  + [Milestone 3: Prototype](https://docs.google.com/document/d/1NB35ZoKwXMawufHfZ95Jo4KrJv48kx7RaJnyo3d85-Y/edit#bookmark=id.r988ar2hi55l)
  + [Milestone 4: Marketing Plan and Final Product Presentation](https://docs.google.com/document/d/1NB35ZoKwXMawufHfZ95Jo4KrJv48kx7RaJnyo3d85-Y/edit#bookmark=id.zfl2rzt68xjd)

# Vocabulary

**beeswax:** a substance secreted from glands located on the underside of a worker bee’s abdomen

**byproduct:** an incidental or secondary product made in the manufacture or synthesis of something else

**cell:** a hexagonal wax chamber built from beeswax for brood rearing and storage of honey and pollen

**hive:** a home to a colony of bees

**honeycomb:** six-sided wax cells in a beehive

# Ag Facts:

* Mississippi has 12 full-time commercial beekeepers, 30 to 40 part- time honey producers and 800 hobbyists.
* Net annual income of Mississippi beekeepers from honey and beeswax production, sale of packaged bees and queens and pollination fees is estimated to be between $2.1 and $3.1 million.
* Mississippi produces about 2.25 million pounds of honey each year.
* There are between 20 and 30 thousand colonies in the state during  
  the summer and 80 to 120 thousand during the winter.
* Honeybees contribute more than $200 million annually to Mississippi agriculture through the pollination of fruits, berries, vegetables, cotton, soybeans, vegetables, peanuts and wild plants.

# Background Information for Teacher:

*Mind Your Own Beeswax* is a Project-Based Learning (PBL) plan. PBL is a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to an authentic, engaging, and complex question, problem, or challenge.A quality PBL experience requires seven essential elements.

1. **Challenging Problem or Question**: The project is framed by a meaningful problem to be solved or a question to answer, at the appropriate level of challenge.
2. **Sustained Inquiry**: Students engage in a rigorous, extended process of posing questions, finding resources, and applying information.
3. **Authenticity**: The project involves real-world context, tasks and tools, quality standards, or impact, or the project speaks to personal concerns, interests, and issues in the students' lives.
4. **Voice and Choice**: Students make some decisions about the project, including how they work and what they create.
5. **Reflection**: Students and teachers reflect on the learning, the effectiveness of their inquiry and project activities, the quality of student work, and obstacles that arise and strategies for overcoming them.
6. **Critique and Revision**: Students give, receive, and apply feedback to improve their process and products.
7. **Public Product**: Students make their project work public by explaining, displaying, and/or presenting it to audiences beyond the classroom.

**Beeswax**

When people think about products from honey bees, they typically think about honey first. Honey is the only food produced by insects that is eaten by humans on a wide scale. A valuable **byproduct** of honey production is **beeswax**. Beeswax is used to make candles, artists' materials, lubricants, polishes, and cosmetics. It is a substance secreted from the glands located on the underside of a worker bee's abdomen. Bees require the protein from pollen and the carbohydrates from honey to create beeswax. It takes 6-10 pounds of honey to make one pound of wax, which is enough to construct 35,000 **cells** within a **hive**. The wax is used by the bees to form cells within the hive for honey storage and to protect eggs, larvae, and pupae through the process of metamorphosis. To form the beeswax into **honeycombs**, the bees chew and mold the wax into hexagon-shaped cells.

Honey bees use the nectar they gather from flowers to make honey, which is stored in the hive's cells. The bees cap off each cell with wax to prevent moisture loss. When beekeepers harvest honey, they collect the frames from the hive and use a hot knife to remove the wax cappings. The wax is taken to a capping tank and the frames are placed in an extractor to spin out the honey. Heat is applied to the wax cappings, causing the honey and wax to liquify and separate. The residual honey is then filtered out. Most commercially available beeswax comes from wax cappings.

# LEARNING PROCEDURES

Interest Approach:

At the beginning of the project, students are introduced to key content using a compelling situation that provides context and serves as a catalyst for an authentic problem or challenge. In Project-Based Learning (PBL), this authentic problem/challenge is referred to as an "Entry Event." Students use the Entry Event to initiate inquiry by reflecting on their prior knowledge of the key content, generating questions that they need to know the answers to in order to successfully complete the project or process that will solve the problem, and identifying what their next steps might be to answer their questions. These questions are used in an ongoing way throughout the project to track learning and guide inquiry. While students may have several questions, one driving question needs to be agreed upon that, when answered, should address the initial situation. Refer to *Milestone 1* for Entry Event procedures.

In PBL, projects are organized into milestones. Each milestone represents a significant stage of the project. Click on each milestone below to access instructional procedures.

1. [Milestone 1: Entry Event](https://docs.google.com/document/d/1NB35ZoKwXMawufHfZ95Jo4KrJv48kx7RaJnyo3d85-Y/edit#bookmark=id.mbb09f9wjdgy) (approximately 1 day)
2. [Milestone 2: Planning and Design](https://docs.google.com/document/d/1NB35ZoKwXMawufHfZ95Jo4KrJv48kx7RaJnyo3d85-Y/edit#bookmark=id.12gdj54oie9t) (approximately 2 days)
3. [Milestone 3: Prototype](https://docs.google.com/document/d/1NB35ZoKwXMawufHfZ95Jo4KrJv48kx7RaJnyo3d85-Y/edit#bookmark=id.r988ar2hi55l)(approximately 3 days)
4. [Milestone 4: Marketing Plan and Final Product Presentation](https://docs.google.com/document/d/1NB35ZoKwXMawufHfZ95Jo4KrJv48kx7RaJnyo3d85-Y/edit#bookmark=id.zfl2rzt68xjd) (approximately 4 days)

**Concept Elaboration and Evaluation**

As a final wrap-up, review and summarize the following key points:

* A valuable byproduct of honey production is beeswax.
* Beeswax is a substance secreted from the glands located on the underside of the worker bee's abdomen and requires the protein from pollen and the carbohydrates from honey to be created.
* Beeswax is used by bees to form cells within the hive for honey storage and to protect eggs, larvae, and pupae through the process of metamorphosis.
* Beeswax is used to make candles, artists' materials, lubricants, polishes, and cosmetics.

Additional Learning Procedures

To help students review and elaborate more about honeybees, try using the [“I used to think…Now I think…”](https://drive.google.com/file/d/1LEZJMy0raPutR8CAFU64Thv8TWTvCpEr/view?usp=drive_link) method to allow students to think deeper and make new connections.

Additional Things to Consider:

[Beekeepers](https://agclassroom.org/matrix/resource/140/)

[Flight of the Honey Bee](https://agclassroom.org/matrix/resource/316/)

[The Bee Tree](https://agclassroom.org/matrix/resource/318/)



Source: <https://www.agclassroom.org/teacher/matrix/>

*For more information and additional lessons visit*

*https://msfb.org/ag-in-the-classroom/lesson-plans/.*