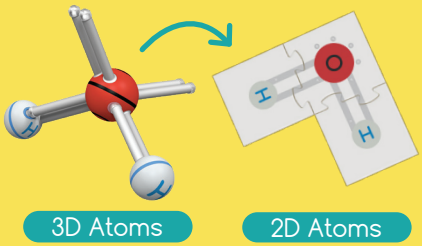
Happy Atoms

Welcome to the World of Happy Atoms!

Happy Atoms provides a fun and intuitive way for kids to jump into chemistry education by building models of molecules and identifying them. Kids learn about the molecules they build by scanning them with the free Happy Atoms app to identify them. This Happy Atoms kit includes two-dimensional (2D) atom puzzle pieces with which to build the molecules. A three-dimensional (3D) version of Happy Atoms is also available, with 3D plastic and magnetic atoms. The app uses image recognition technology to identify the molecules you build with either the 2D or 3D atoms. The app guides you through the assembly and identification of many important molecules. Have fun!

When using the Happy Atoms app with Happy Atoms 2D, simply substitute the 2D puzzle pieces for the 3D atoms shown in the app.



Getting Started

1. **Please start by installing the free app.** Follow the instructions on pages 2 and 3 to get started with the Happy Atoms app.

2. **Take a closer look at the atom puzzle pieces** included in this kit. What do you notice about them? You can read more about how to use the Happy Atoms system on page 4.

Happy Atoms 2D Kit Contents

Hydrogen x14

Atom Puzzle Pieces:
The Happy Atoms 2D system includes 50 puzzle pieces representing the 16 elements. Here is an overview showing how many of each element is included in this kit.

Helium x1

Lithium x2

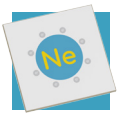
Beryllium x2

Carbon x6

Nitrogen x3

Oxygen x6

Fluorine x2



Neon x1

Sodium x2

Magnesium x2

Silicon x2

Phosphorus x2

Sulfur x2

Chlorine x2

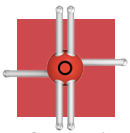
Argon x1

Bond Extenders:
Use these pieces to connect bonds that don't "reach" on their own.


Straight x8


Corner x8

3D Happy Atoms:
Samples of the atoms from the 3D Happy Atoms system are included so you can get a feel for it.



Oxygen x1

Hydrogen x2

⚠ WARNING — This product contains small magnets. Swallowed magnets can stick together across intestines causing serious infections and death. Seek immediate medical attention if magnets are swallowed or inhaled.

585005-02-130721

THAMES & KOSMOS

Getting Started with the Happy Atoms App

Installing the App

1a Open the iOS App Store, Google Play, or the Amazon appstore on your tablet or smartphone. Search for the **"Happy Atoms"** app.

1b Alternatively, you can scan the QR code to the right to open the Happy Atoms product web page. Scroll to the "Downloads" section of the page. There you can find buttons to open the Happy Atoms app store pages.

2 When you have found the Happy Atoms app, tap the "Get" or "Install" button to download and install it on your device. The app is free to download and install.

3 After the app has finished installing, tap the app icon to open it. Now you are ready to start using the app.

Happy Atoms

Device Requirements

Check the app stores for details.

Download on the App Store

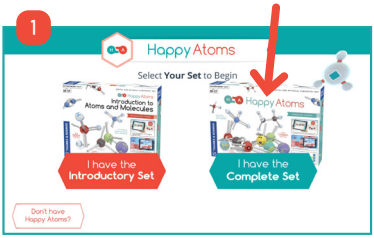
GET IT ON Google Play

available at amazon appstore

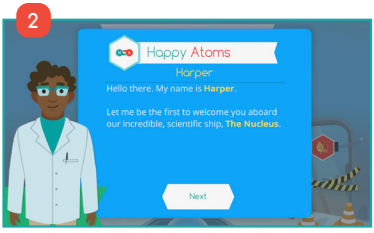
Using the App

The Happy Atoms app is designed to guide you through the process of using the Happy Atoms system: Building molecules, scanning molecules to discover them, learning about the molecules you discover, and conducting the guided research tasks. Here are some helpful tips to get you started.

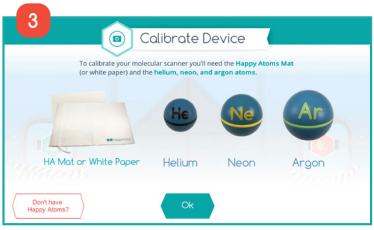
1 When you open the app for the first time, you are asked to select which specific Happy Atoms set you have. **To use the app with Happy Atoms 2D, select "I have the Complete Set" on this screen.**



2 You are then welcomed aboard The Nucleus, the name of your flying scientific ship, by Harper and Andee, your research colleagues. With this ship and Harper and Andee's guidance, you can navigate the world of Happy Atoms!



3 Next, the app takes you through some calibration steps for your device's built-in camera, so that it can function as a molecule scanner.
To use the app with Happy Atoms 2D, whenever 3D atoms are shown in the app, simply replace them with the 2D atoms from your kit.



Note

In order for the molecule scanner to work properly, you must place your built molecules on a **white surface** for scanning, such as a white table, sheet of paper, or table cloth.

Another important factor in getting your molecules to scan properly is the **light level.** The molecule scanner works best in **bright, indoor lighting.** It will not work as well in dim lighting or very bright direct sunlight. If you are having trouble getting the app to recognize your molecules, try adjusting the light level and the white background surface.

4. Place the Helium, Neon, and Argon atom puzzle pieces on a white surface and tap the camera icon on the right side of the screen to take a picture of them.

5. Next you will calibrate the camera by making and scanning your first molecule.

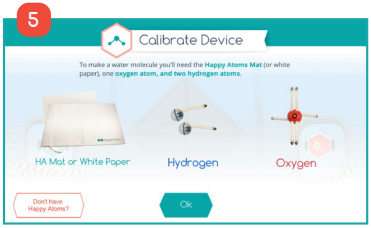
6. Follow the step-by-step assembly instructions to assemble two Hydrogen atom puzzle pieces and one Oxygen atom puzzle piece into a molecule. Then scan it.

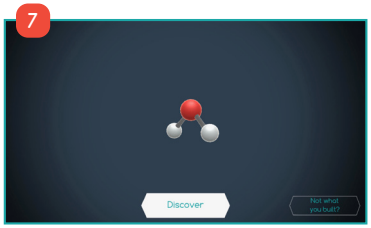
7. After successfully scanning, tap "Discover" to learn what molecule you made.

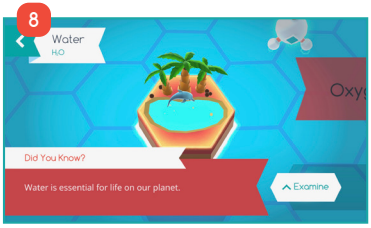
8. Tap "Examine" to learn about the molecule.

Now that you know the basic process for making, scanning, and identifying a molecule, try following the **hints** on other territories to build new molecules. Or tap on a territory to open **step-by-step building instructions** for a specific molecule.

Ultimately, your goal is to build and discover all of the molecules suggested by the app, to complete the **molecule map.** You can also go into Harper and Andee's labs to complete a series of tasks in the **guided lesson plans.**







Additional Resources

Scan this QR code for helpful tips if you are having trouble using the Happy Atoms app.

Scan this QR code to visit the Happy Atoms product page for the full-length manual and sample lesson plans for educators.

Our tech support team is ready to help! **support@thamesandkosmos.com** or **1-800-587-2872**

Using the Happy Atoms 2D and 3D Systems

Happy Atoms is a part digital, part physical system for teaching chemistry. The digital component is an educational app. The physical component is a set of atom models representing 16 different elements, either as 3D plastic models or 2D puzzle pieces.

Happy Atoms 2D is a lower-cost alternative to the original 3D Happy Atoms, allowing you to use the same educational app by substituting the magnetic 3D atom models with the 2D puzzle piece atom models.

The following is an overview of the 2D and 3D atom models. **If you are already familiar with other molecular modeling systems, it is especially important to understand the unique way atoms and bonds are represented in the Happy Atoms system.**

1. The **arms** (in both the 2D and 3D models) and the **e⁻ circles** (in the 2D models) represent the **valence electrons** (the electrons on the outermost shell of an atom that are important for chemical bonds) of the atom.

2. Unlike a ball-and-stick atomic modeling system, Happy Atoms uses **two arms** to represent a **single bond.** By representing electrons this way, students may better understand that there are two valence electrons involved in a single covalent bond. The ball-and-stick model represents a single covalent bond using just one arm to represent two electrons.

3. In the 3D models, the flexible arms make it possible to model **double bonds**. This is achieved in the 2D models by using **corner and straight bond extender puzzle pieces.**

4. By using six arms or four bond extenders, even **triple bonds** can be modeled.

5. Happy Atoms is also able to represent **ionic bonding.** The elements in the first two groups of the periodic table have clear arms and no magnetic bonding sites (3D) or just one arm (2D), to show how they give up, rather than share, electrons.

6. The **magnetic connections** in the 3D model offer an embodied, tactile experience of bonding: Energy is released when bonds form, while energy is required to break bonds. Students feel how the magnets and arms easily pull themselves together when forming bonds. They also feel how the magnets and arms resist being pulled apart when bonds break.

When building molecules with either the 2D or 3D Happy Atoms systems, you want to **fill up all the bonding sites** (magnetic holes or concave jigsaw puzzle piece areas) with electrons in order to create **"happy atoms"** — in other words, atoms with **full outer valence shells.**